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A Bill of Rights for Old Age

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THIS IS CHAPTER 14 FROM DR. LAWTON'S RECENTLY PUBLISHED BOOK, "AGING SUCCESSFULLY," WHICH REPRESENTS AN INFORMAL DISCUSSION ON HOW THE MOST SATISFACTORY ADJUSTMENTS TO THE PROBLEMS OF THE OLDER YEARS CAN BE MADE. "THIS CHAPTER IS AN ATTEMPT AT VENTRILOQUISM IN WHICH THE WRITER ACTS AS DUMMY AND ALLOWS OLD AGE TO TELL ABOUT ITSELF AND ITS REACTIONS TO THE WORLD IN ITS OWN WAY. AS SUCH, THE CHAPTER IS A SYNTHESIS OF MANY ACTUAL REMARKS AND SENTIMENTS OFTEN HEARD AND OVERHEARD." A GROUP OF OLD PEOPLE, MEETING IN AN IMAGINARY BUT TYPICAL RECREATION CENTER FOR SENIORS, CONCEIVE THE IDEA OF A RADIO BROADCAST TO TELL AMERICA, NOT OF ANY TOWNSENDITE SCHEME, BUT OF THE HUMAN NEEDS OF ELDERS AS PEOPLE. THE IMAGINARY BROADCAST GOES ON THE AIR, AND THE OLD PEOPLE THEMSELVES PRESENT THEIR TEN DEMANDS.

IN THE Recreation Center for Seniors, a group of older men and women one afternoon were discussing the way every group in America is talking about its rights. Mr. Hunt remarked quietly:

"It is about time that *old people* spoke up for *their* rights."

"Sure," retorted Mrs. Dodge, "that's a good idea, but who's going to listen to us? I live with my daughter and her family. They're fine young people and good to me, but I can't talk to them about myself or what I want."

"Yes," agreed Miss Atkins, "to whom shall we tell it? I see nobody except the lady who gives me my Old Age Assistance checks, my landlady, and you people when the weather lets me come here."

Mr. Hunt seconded that: "No one ever listens to old people. I'm in the Home for Aged Men Who Have Seen Better Days. The superintendent means well. But he has a tough time just running the place. Every time he wants to start something new he has a battle on his hands with the trustees. They think that three meals a day, a roof over our heads, a quick look by the doctor every two weeks, and some plushy platitudes at Christmas is all we need. For their generosity we must be endlessly grateful. Maybe we should.

"Anyway, it's no use to talk to them. They have higher things on their mind. If we hand them a Declaration of Independence, we'll only upset a lot of nice people. It's funny, but if we wanted a new rug or chair, or better meals, they would understand and we might get what we want."

"I've got an idea," broke out Mrs. Martoni. "Suppose we have the meeting right here, invite everyone we can think of, and tell them. That's the way we'll reach people."

Mrs. Bluestein shook her head. She was an active though lame woman of 81 who lived alone on a small income plus what she earned running her own little shirt hospital.

"This place will hold only 150 people. We want to reach more than that. We want to tell how old people feel about themselves and how other people feel about them: the young, the middle-aged, the old who are

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"A Bill of Rights for Old Age" is reprinted from Dr. Lawton's new book, *Aging Successfully*, published in December, 1946, by the Columbia University Press.

rich and who therefore forget they are also old.

"I've got an idea. I listen to the radio all day as I work. Let us write a nice letter and send it to the different radio companies. Maybe they'll give us a half-hour on the air at a time when ten or twenty million people will be listening. We'll tell them that if anyone wants to do a good deed for old age, instead of giving us another old age institution he should take that money and buy us a chance to talk to America. Then we'll get everything we need."

Mr. Hunt's usual bored attitude vanished. "That's wonderful, Mrs. Bluestein. I'll write the letter. I'll explain we don't want to talk about Townsend or Ham and Eggs schemes. Sure, who doesn't need more money? But we'll let others talk about money or medical care or housing for the old. We'll be different; our program will be about old *people*: what we need to be happy —everything we need."

Miss Atkins queried softly: "But who will do the talking on the radio? Will you?"

"No," Mr. Hunt protested, "no, I'm not good at that. Maybe Mrs. Dodge would —she's always talking."

Mrs. Dodge gave him a sad look and shook her head.

Mrs. Martoni explained apologetically: "My English isn't too good; anyway I'd get tongue-tied—imagine me talking to millions of people. I would just die."

"So would we, Mrs. Martoni," Mr. Hunt commented briskly.

Mrs. Bluestein, who had been thinking hard all this time, spoke hurriedly: "I've got it. All of us will do the talking, each a little bit. We'll write it out in advance, and each will read his part."

And that is how it happened. At 7:55 P.M. of a dateless day, our friends of the Recreation Center for Seniors, dressed in their finest, were nervously watching the large second hand on the clock in Studio 8H. And at 8 o'clock, they had started on their script. Never before had there been such a program. The jaded personnel of the radio studio, certain they had heard every possible kind of program, never quite got over it. For the "unseen audience" it was unbelievable. For the actors and actresses it was appalling but heavenly.

We hereby wish to indicate our deep appreciation for permission to reproduce here the broadcast which was given that night.

ANNOUNCER: This is WOLD, New York. New Life for Old, creators of new ideas for older men and women, presents the Voice of Old Age. This is the first program of its kind ever to be presented to the American public. Seated here in the studio are a group of old people waiting to talk to you and tell you what is on their minds. All they will let me say is that it is a Magna Carta for Old People. This is no soap opera with a happy ending, no folksy story by prim old ladies in bonnets and rheumatic

old gallants. This is real stuff, real life. From now on it's going to be all their show. I'm turning the microphone over to the Master of Ceremonies, a woman of 81. She has an odd name, but she'll tell you about that. The next voice is . . .

MASTER OF CEREMONIES: Mine . . . Ladies and gentlemen of the radio audience. This is quite an experience for me. Why did I ever agree to act as Master of Ceremonies? But here I am. I guess I'm doing it because, scared as I am, the rest are more scared.

One day, at the Center, they were teasing me about my age, and I came right back at them. "I'm 81—so what?" I said. "You tell me what I *can't* do. I'm as alive and alert as anyone else here. *I* can do anything *I* want to do!" And since then the name "eighty-one—so what" has stuck to me.

One of the group here is quite a tease and his sharp tongue draws blood at times. But he is smart, and we're proud of him, for he is the editor of our paper, the "Senior News," and the president of our club. We call him "The Brain."

(Male voice breaks in: Thank you, "So-What," for the flowers, but I can feel the thorns, if you mean what I think you mean.)

MASTER OF CEREMONIES: We have ten demands in our Bill of Rights. I shall tell you some, and from my companions here you will hear the rest, unless you turn your dial to Bob Hope.

And so, my radio friends, let us start!

1. THE RIGHT TO BE TREATED AS A PERSON

Maybe as we have gotten older we've slowed down and got rusty; perhaps we can't do all you younger people can. We haven't the same interests as you, for which occasionally we're thankful. But we're people, old *people*, not something that the radar picked up on another planet.

Old men and women are more like people of younger ages than unlike them. If you don't know how to act toward us on some particular matter, just treat us the way *you* would want to be treated. The Golden Rule includes old people too.

A long life doesn't make a good human being out of a bad one, nor a *bad one out of a good one*. We're all good or bad *people*. Dislike old people because they are old, that's your privilege, though maybe you could try to cultivate a liking for old people as you do for olives. Dislike us also if we do things that are wrong or disagreeable, as we often do. But please, when you refer to us, don't say "the old witch" or "the old buzzard." It's temperamental on our part, I'm sure, but we do like to feel we still belong to the human race.

Each one of us—young, old; well, sick; rich, poor; gay, sad; bright, dull—each one of us still wants to be considered an individual. Just because all of us in this studio are old doesn't mean we have identical feelings, thoughts, likes, and dislikes. Are you exactly the same as other people your age? Do you know that the longer a human being lives the more like himself and the more unlike anyone else he becomes? It's younger people who are the conformists and who resemble each other more.

One reason for not understanding old people is that until recently there haven't been many around. The only way to avoid old age is by dying, and as medical science keeps us alive longer, there will be more old people and you will get to know them better. You even may be one of them, if you are lucky. I hear you say, "Not lucky, *unlucky*!" We don't want you to feel that way. It is to create a newer attitude toward the "second forty years" that we are here tonight.

2. THE RIGHT TO BE TREATED AS AN ADULT

As we get older our troubles multiply, though don't imagine that youth always enjoys or that old age always suffers. But don't pity the older person struggling with a problem. Once you do, it means you

believe you are the stronger, standing on a height and looking down upon him, the weaker.

Once upon a time you were a child. Remember how you got sick and tired of being pushed around? Now you are a grown-up and isn't it grand? You can pick your own clothes, own bedtimes, your own friends. But there is a fly in the ointment. You can't fully enjoy being a grown-up if there is another in the family older and above you. We don't want to make you play ointment to our fly, yet you cannot hope to make children out of your parents much as you try.

Your paternal and protective attitude may stem from the best of reasons, but a good impulse can still lead to a bad result, as the man who tries to settle a family quarrel discovers.

Look, all you kind, nice people. It is true some old men and women have lost their minds and need nurses and guardians. But most of us do not. We are grown-ups. We have a right to use our own judgment and run our own lives. We need to, because if we don't use our mental and moral muscles, and you do all the thinking and deciding for us, we become helpless cripples. Take the healthiest man in the world, put him in bed and keep him there for a long time, and he wont be able to walk.

If you want to help us, don't merely stop us from doing something and then wonder why we decline, are unhappy, and make you unhappy. Give us a substitute that will be almost as good as what has been taken away. Pitying us may make you feel strong for a little time; but it will make us feel weak much longer. And let me whisper that inactivity often does us more harm than a hard day's work, or staying up for a late session of gin rummy. We want affection but we want the real thing. Don't call us "honey" and "dear," as a kind of act to make us feel comfortable.

I live in the Home for Genteel, Indigent, and Aged Females, but I come to the Recreation Center every afternoon because I get here what I don't get there. Our superintendent calls us by our first names and when he sees us in the hall he puts his arm around us, pats us on the head, chucks us under the chin, and we get a great deal of palaver, like "You're quite a girl yet—got any date tonight?" or "We better be careful and keep the men away from you."

He smiles tolerantly while we talk. But actually he seldom hears what we say and seldom takes our wishes into consideration. Just you go into his office and ask a question or complain. He'll tell you off, short and to the point. We know then who is giving and who is receiving.

My friends here are signaling me to lay off. But the superintendent is not listening tonight, nor are the trustees: unless it is by accident. Those connected with institutions or services for old people may be interested in "The Aged," but few would ever think of *listening* to particular men and women talking about their problems.

The trouble with all institutions for older people is that those in charge want a place where the budget is met, meals are served on time, no one ever criticizes, asks for anything, or dies in an accident for which the institution might be responsible. How can the superintendent ever feel differently? The board pays his salary, we don't. If we complain, he says we're "senile," "unappreciative," "seeking attention." The superintendent is keeping us from ever developing any initiative of our own. Even in an institution for older people there can be democracy and real self-government, not a company union.

You can't deceive the very young or old with patronizing affection. My granddaughter and I know when anyone really cares about us and is listening with all his mind to what we say. We know when the rest of the family respects the significance to *us* of what we say, believe, or do. The person who shares things with us makes us feel that what is happening to us is important to us *because we say so*. Since he loves us or is our friend, it becomes also important to him, whether or not he fully

understands it or gives a hoot about it personally.

I often wish the words "A Place Where Old People Are Happy and Understood" were chiselled on the front of the building instead of "Home for Genteel, Indigent, and Aged Females." My heart sinks every time I read it.

If any employee or Board member of my home hears this, I really don't care. Life has done too much to me already for me to worry about what more it can do. One good thing about old age is that it gives you the freedom to speak your mind. You stop worrying about what people will say. They say it anyway.

So to all those who have to do with old people, there is a special little speech I'd like to make. Think of this: If you are old, only circumstance has made you the dispenser of kindness and me the recipient; if you are young, it is only circumstance that has made my birth precede yours. Remember, my friend, your birth also has preceded others.

3. The Right to a Fair Chance on Our Merits

We want an opportunity for self-expression and self-development, for a vocation, an avocation, an education. A democracy is a place where people can compete for opportunities regardless of race, color, creed, or *age*. If we look for a job, don't let our gray hair make you give it to us or keep it from us. It belongs to any person able to meet the requirements of the position, and everyone deserves a fair chance to demonstrate his fitness.

Grant us the right to be regarded as a worthy opponent. Nothing annoys an old person more than to have you shrug your shoulders, smile generously, and say, "After all, he's an old man." You wonder why the next time you meet him he wears the annoyed or injured expression you hate to see on his face and he hates to put there.

Don't tell us, "Grandma, that was all right when you were a girl, but we don't do things that way today." Explain why not and let us explain to you. Fifty years from now you'll want that relationship with your children. Neither the young nor the old may convince or obey the other, but at least each has shown that he regards the other as a reasoning animal whose arguments, though faulty, have merit.

Old people's minds get stiff like their knees. When we say something that you think is wrong or odd, don't smile or stay silent out of respect for old age. You are cheating us of a challenge and a chance to exercise our wits.

Don't tell us, "You're too old to understand." We have gone through all the experiences that you are now going through. Some of us are still going through them.

Perhaps we don't understand. But "old age" isn't necessarily the reason. Our "poor reception" may be due to insufficient intelligence, education, or friendliness to new ideas.

4. The Right to a Say About Our Own Life

It took us a long time to grow up, but most of us finally made it, or so we hope. But just because we've reached old age is no reason why we should abandon the right of self-determination.

Do you want to understand old people? Then try to understand the adolescent. He struggles to become adult against your attempt to keep him a child. We struggle to remain an adult in spite of all the things that reduce our independence: inadequate energy, money, health. Give us the chance to remain until the last minute managers of our own life and affairs.

If you believe we're not in our right minds, check with the best scientific opinion before you make any plans for us. But if our mentality—such as it is—has held up, let us make our own decisions and assume the responsibility for them. Before you offer help or advice, wait until we ask for it and be sure your program really will increase our own ability to solve our own problems.

No adult, not even an old one, ever loses

the inalienable right to make his own mistakes and do his own discovering. It is for us to choose where we want to go and how, and whether we want to shorten our days through lengthening our nights or by working too hard.

A child gets an awful lot of do's and don'ts. Remember how, when you were in your teens, the phrase "you're too *young* to do that," kept alternating with "you're too *old* to do that." With us, it is only the second one we ever hear.

But why don't you go on and explain that: "You are too old to live alone because . . . " or "too old to get a job, get married again, go back to school because . . . " "Too old for that" is used whenever you don't want us to do something. You are not sure *why* we're too old, but you just know we are.

You were once children who had been controlled; now *you* want to do the controlling, though our physical and mental helplessness may not yet warrant it. In my bad moments I like to believe that others would prefer old people to be neither seen nor heard, but turn into bureau drawers pulled out when we were wanted and pushed back when we weren't.

You fifty-minus people have grown up with a certain view of how the sixty-plus group is to be treated, and even you find it easier to stick to an old idea, right or wrong, than to accept a new one. At 40 you already are living in your past. Funny, isn't it. The "soon-to-be old" and the "already old" are each in their own little cells, prisoners of their own pasts. The trouble is that it isn't the same past. If it were, we would understand each other much better. When we *don't* try out a new idea you make fun of us, but you laugh even more when we *do*. But old people, regardless of what others think, have a right to try out whatever ideas they want—providing they really try them out.

5. The Right to a Future

Everything that lives wants something to look forward to, to plan for, to work for. Food, lodging, and clothes are necessities, but would *you* be satisfied with only these at 15, 25, 45?

Suppose suddenly you had no future. Not good, is it? Well, it isn't good for us either. You complain about old people living in the past. Where else are we to go, if that is the only place we are permitted to visit?

Let the past bury its own dead. If we are able to forget it, let us. We may have been or we may even now be scoundrels, fusspots, defeatists, but the important thing is whether there is any chance of our becoming otherwise. Don't say: "It's no use; he's too old. There's no kind of work he can do, no way he can make life interesting to himself or to others, no contribution he can make to the world."

Charles Kettering once said: "My interest is in the future because I'm going to spend the rest of my life there." For any human being to lose his future is to experience one kind of death and one kind of hell.

6. The Right to Have Fun and Companions

We may be old and faded, our bones may ache, and some of us may have cobwebs in our brains. But, to use a radio competitor's slogan, we still want life to be "so round, so firm, so fully packed." We want a chance to feel important; we want fun, play, parties. We want companions, books and music; and we "must" have a radio, but don't always expect us to be listening to programs like this one. We want friends to visit us; we want to visit them, if we are able.

If we don't get these things where we are, in our own apartment, own furnished room, or our children's home, we've got to get them somehow, somewhere. If we don't get it—well, if we don't get it, that's old age for you. Since we have enough fears as it is, don't add to them by saying, "You'll have to stay in, there's ice on the ground." Instead, if it is bad underfoot, occasionally make possible for us other forms of transportation.

Also, don't talk against our having friends. With age we keep losing the few we have, and get more ingrown anyway.

Friendship is never so precious as in old age. Encourage us to have our own lives and we won't have to stand at your keyhole, or become parasitic growths on your experiences or pleasures.

My daughter-in-law is afraid that if I visit a friend I'm going to talk about my unhappiness at home. But I'm not unhappy there: just bored and restless—perhaps it's the senile delinquent in me coming out.

My daughter-in-law tells my son, "I can't understand why mother is so anxious to get out of the house." I'll explain why now. We old people like to go among strangers, because they take us for what we are. If we're nice to them, the chances are they will be nice to us. They don't know our past, and they don't keep trying to separate the truth from the fluff in our stories. We may not be the person we pretend to be, but they respect our try at it anyway.

7. The Right to Be Romantic

Romantic feelings do not depend on youth, but on the strength of one's affection and imagination. "Romantic" is another name for a man or woman's ability to idealize, for the joy he gets in living, and for his desire to share that joy.

Faded and rheumatic oldsters get "that way" about someone of the opposite sex because they want to participate in the great experiences of life. What youth believes to be its sole possession and privilege really belongs to the life force, whether that is 20 years old or 70.

Plato held that love is the desire to unite oneself to something beautiful and with it to create. But why think creation means only sexual pleasure or biological reproduction? Creation may be mental, spiritual, artistic. One can be creative with someone of the opposite sex by sharing ideas, experiences, and pleasures: visiting interesting places, reading, and listening to music together.

We don't ask the young to adopt the love-making style of oldsters or to believe that they can be romantic. What we demand is the right to be romantic, so long as we violate no law or city ordinance.

8. The Right to Your Help in Becoming Interesting to You

Someone once remarked to a Blue Ridge ancient: "I bet you've seen plenty of changes here in your day." "Sure have," agreed the old man, "and I bin against every single one of them!"

Old people can block the path of progress and can be unappetizing and disagreeable. But how does this come about? Perhaps you have contributed a little to our becoming out of date and disagreeable. As you reach for the radio knob, I want to say I don't mean you, or you, or you; I mean all of you—together. I even include myself.

I'm 74, but when I was 30 and 40 and 50, I did exactly what you do to make life difficult for older people. Back in 1915 when I felt sorry for old people or denied them opportunities to grow and develop and to keep on learning and doing, I didn't realize that I would live long enough to reap what I sowed.

What do you expect to happen to us? You deprive us of an opportunity to work. When our daily routine and our pay envelope go, we lose our self-respect and sense of usefulness. Result: We sit around all day, nurse our ailments and grievances, twiddle our thumbs, and twiddle yours. We get in your hair, we get in our own.

What would *you* do under such circumstances? I live with my son, daughter-in-law, and two children. I'm home all day Though I still have almost enough energy to run the entire house myself, small as it is, it would be unfair to deprive my daughter-in-law of that opportunity. Her home is everything to her. She is just as I was years ago: full of energy and glad to do all the work herself. And she too, as I was and still do, has lots of homemaking ideas and no outside interests.

If there were two nearby houses—or if I had a little kitchenette and bathroom connected with my room, and could entertain my own friends there—but what's the use. There is only one house, kitchen, bathroom.

I know I'm in the way when my son and daughter want to quarrel or make love. I can't stay in my room all day long and evening. Even if I do, I can hear through the thin walls. It's not my fault if I'm an unintentional eavesdropper.

Neither do I want to mix in household affairs. But my daughter-in-law asks my advice about the house or the youngsters. If I try to avoid giving it, I'm scolded for lack of interest; if I give it and it doesn't work out, the result is laid at the door of old-fashioned ideas.

If I go to the beauty parlor, my daughter-in-law talks to the neighbors about "these old women who think they're still young girls." I'm not a young girl and I am not beautiful—I mean, I never was what you'd call "glamorous." I go simply so that I'll look no worse than I have to. Anyway, when I go to the beauty parlor, the trip is the event of the day. It's one place where I don't feel I'm like a child underfoot. I'm paying my good money and I get what's coming to me as a *customer*, not an *old* woman or helpless *mother*.

A few years ago, I told the children I would like to do things outside of the house and get a part-time job in town. My daughter-in-law said that would disgrace her and show everybody they didn't have enough money. My son objected because people would think he didn't have the goodness of heart to take care of his own mother.

Goodness, I raised five children and worked much of my life. I can't say I'm going as strong as I used to, but I'm no frail bric-a-brac that has to be wrapped in glass wool. I suppose it is too late for me to go back to school, but even if all I want is to see my friends or attend a lecture, what happens? My son and daughter-in-law look out the window and shake their heads: "Too cold; too hot; too wet; too dry." If I want to go take up some new interests, they laugh at me. They tease me unmercifully because I come to the Recreation Center for Seniors and if they knew that I, their "timid, wraithlike grandma" was on the air now, there would be the devil to pay. The only reason they let me out on this raw, blustery night is that I told them I had received an urgent call from a friend.

Maybe tomorrow I'll get up enough courage to say to them: "I don't want to make martyrs of you and have you spend time with me because it is your duty. I'd rather you did it because you enjoyed my presence. If I'm cranky at mealtime, tell me about it calmly and firmly, just as you would with a young person. If I do anything else that is wrong, annoying, or out of place, either in your home or the community, tell me. I will try to do my part; if not, you've discharged your obligation. But please don't impose the rules: explain them.

"If I'm dull and boring to you, if I'm ornery and old-fashioned, you might try to help me become different. Please have the same interest in prolonging my span of usefulness and pleasure as my life span."

There are different ways of dying, and "You pays your money, but don't get yer choice." One way is to die fast, without knowing it, as in your sleep, and that's something we old people all pray for. But there are other ways of dying, though we don't call it that. We call it old age, and we drag out the final scene over many years.

Here's a sample. It's Tuesday, 6 A.M. (we get up earlier with age) and it's raining. We look at the ceiling and say to ourselves, "Another day. What am I going to do with myself today? How am I going to push the hours away?" As we grow older, we all get more and more "chronicidal," a word I made up myself from *chronos*—time, and *cide*—to kill.

Help me to become the kind of mother and grandmother whose company you'd seek. The next move is yours.

9. The Right to Professional Help Whenever Necessary

Change is the law of life. From the moment we are born to our death, our minds and our bodies are constantly changing. Most times these changes are natural and gradual and we adjust ourselves to them without difficulty. But there

are times when things go wrong with our body or with our mind. When that happens, we should get professional help: from the doctors, the psychologists, the psychiatrists, the dentists, the vocational guidance centers, the employment agencies, the beauticians, the physical culture experts, the chiropodists—whatever the community provides.

Your sympathy is nice, and so is the sweet smile and pious sentiment "You know, Pa, you're not as young as you used to be." Of course we aren't. Neither are you. But don't act as if nothing can be changed.

Our end may be near, but don't use that as an excuse to keep from doing the things for us that are necessary now. Our loved ones and our dear and most necessary physicians should take our illnesses and infirmities seriously; they should know the difference between a disease that can be cured and something that is part and parcel of growing old. A doctor once said to me, "You're 80, aren't you? How long do you want to live?"

Now no one in Studio 8H and no one in the radio audience knows how much longer he has to live. And even if he did, he's got the pain and sickness today. All of us want to be as well as we can as long as we live, even if that's only six months.

You're young and you are always reading about radar, color television, new medical discoveries, new surgical treatments. Well, there are new ways of keeping older people interested and happy, and there are trained persons to apply these ways. Give them a chance at us. We'd rather have a richer life and a poorer funeral, rather a fine set of perfectly fitting teeth or a chance to learn an interesting hobby than a gorgeous tombstone.

10. The Right to Be Old

The human race has been here for a million years or more and civilization is perhaps seven thousand years old. If you think that to be good something has to be young, then the real youth of mankind was a long, long time ago, as Francis Bacon said. Alongside the history of the human race all of us living today are ancients, and the fifty years of difference between grandpa and grandson is really very little. If anything, grandpa is younger since he is nearer the youth of mankind. After that, perhaps both grandpa and grandson will keep quiet.

Speaking seriously, it is wrong of old people to make fun of the present, but it's equally stupid to think that anything done fifty years ago must necessarily be wrong. A good idea is a good idea, regardless of when it was first broached.

Let's suppose we are old. Perhaps we tire of the struggle to seem "not old." Perhaps the long-dreaded day has arrived: We are definitely, indubitably, an old man or woman. Now when we refer to ourselves as "an old person" we hear no stout denials. We speak and walk more slowly. We prefer to stick close to the fireside, to listen and watch.

We want no special concessions because of all this. We climb five steps and stop to consolidate our forces. So will you in the years to come indulge in the "pause that refreshes"—to bow to another radio competitor. If you stand by patiently until we have climbed the stairs and got out of your way, do so only because you want to be helpful to a person who has a handicap, just as you would with a young person who for some reason could not walk fast. With him, it wouldn't be pity, it would be your sense of humanity.

We want a chance to remain self-respecting and participating members of the community, who happen to have lived longer than the others, and who don't have to conceal the fact or apologize for it.

May I read you a poem by Karle Wilson Baker? It is called

LET ME GROW LOVELY*

Let me grow lovely, growing old—
So many fine things to do.
Laces and ivory and gold
And silks need not be new.

* Published by the Turner Company, Dallas, Texas.

There is healing in old trees;
Old Streets a glamour hold;
Why may not I, as well as these,
Grow lovely, growing old?

I'm getting a signal from the control room —two more minutes.

Radio friends, I can't see you or hear you. But it's been wonderful talking to you tonight about these things. We can't always talk to each other about them . . . and there is no one else. It has been grand also to talk as much as we want, with no comebacks. At least, not until tomorrow morning's mail or later when the sponsor calls us in to his office. I can just hear him say, "A good thing is a good thing. But you should have gone a little easier on the young and middle aged. After all, they are conservative and unaccustomed to these revolutionary ideas."

We've come here tonight to talk to you about the future: our future, and therefore your future, since you are us thirty years earlier.

Very few American communities do as much for young people as they should. It is more important to help them than us, and we older people have a great desire to see boys and girls get as much out of their lives as possible.

But we old people also need things. Young people at least have spokesmen and we all like to look at them and be with them. But old people—who speaks for them, who seek out their company: for purposes of pleasure, I mean, not to do volunteer welfare work? That's why we've had to get up here tonight and do the job ourselves.

To all of you who have listened to us until the end, my friends and I extend our deepest thanks. It's been a great moment for us, fun but serious, too. I guess that's all. Goodnight.

ANNOUNCER: New Ideas for Old has just brought you a group of men and women from the Recreation Center for Seniors who have presented a Bill of Rights for Old Age, a program which they themselves conceived and wrote.

This is Station WOLD New York, 000 on your dial.

SUMMARY

The ten demands comprising a bill of rights for old people are: (1) The right to be treated as a person; (2) the right to be treated as an adult; (3) the right to a fair chance on their merits; (4) the right to a say about their own lives; (5) the right to a future; (6) the right to have fun and companions; (7) the right to be romantic; (8) the right to others' help in becoming interesting to others; (9) the right to professional help whenever necessary; (10) the right to be old.

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Research in Cardiovascular Diseases

ALFRED E. COHN

AFTER A LONG AND EMINENT CAREER AS A CARDIOLOGIST, DR. COHN HAS NOW RETIRED. HOWEVER HIS EYES ARE TOWARD THE FUTURE RATHER THAN THE PAST. WHILE HE REVIEWS BRIEFLY, IN THE FOLLOWING PAPER, SOME OF THE ADVANCES MADE IN THE FIELD OF CARDIOVASCULAR DISEASES, HE DOES SO MERELY TO EMPHASIZE WHAT MUST STILL BE LEARNED. DR. COHN EMPHASIZES THAT DYING OF CARDIOVASCULAR DISEASE BEGINS YEARS BEFORE THE TERMINAL EVENT ITSELF OCCURS, AND MAY BE RESPONSIBLE FOR A PERSON'S INCAPACITY AND INACTIVITY DURING THE YEARS OF HIS INTELLECTUAL AND SOCIAL MATURITY. IT MAY BE POSSIBLE, DR. COHN BELIEVES, THAT FUTURE RESEARCH IN CARDIOVASCULAR DISEASES CAN CUT SUFFERING DURING THIS DEGENERATIVE PERIOD FROM YEARS TO MONTHS.

IT IS only when the race is nearly run that a participant can pause to survey the ground over which he has travelled. Is it not a natural temptation, as he nears the goal, to wish to write out his reflections? If he fails to do so, other men may, in fact, be the poorer for missing the fruit of his experience. In long races, run in relays, a token is passed from the previous to the next runner, who carries on. No time is wasted. No ground, once gained, is lost. Not to do this in the advancement of learning is to pay a heavy price: the risk of discontinuity in the march of a tradition, the necessity of recapitulating what has already been thought out, a lag in consolidating the gains which should be a legitimate heritage.

Because of the increase in the numerical rate of those who suffer from cardiovascular diseases, there is now a great need to solve the urgent problems that are concerned with failure on the part of the heart, the blood vessels, and the circulation to perform their functions. These problems divide themselves into problems of form (or structure, or architecture, or anatomy) and of function (or behavior, or accomplishment, or performance). Maladies develop because neither form nor function has been adequate to its natural ends. Clearly, the heart performs its appointed function through the exercise of its muscle; the life of the body is maintained through the circulation of the blood. These are the essential elements in the cardiovascular system which require description. It is also necessary to discuss what aid is wanted, and for what reason, when this system or any part of it ceases to do its work with perfection.

The study of the cardiovascular system, comprising pathology, anatomy and physiology, moved out of the realm of myth with the studies of Corvisart 140 years ago. As important as their researches have been, the names of Auenbrugger, Laennec, Hope, Ludwig, Bouillaud, Wenckebach and Mackenzie may, for the present purpose, be omitted. Thirty years ago a certain situation attracted wide attention and seemed threatening. Mortality statistics at that time disclosed the fact that cardiac diseases were causing more and more deaths. Students of these diseases rightly turned public energy to the need of combatting this rising tide for it was assumed that it constituted a great threat to the public health. This was true, but the threat turned out to be different from what it was supposed to be. The assumption was that in some way it was the sequel to rheumatic fever which influenced and indeed dominated the situation. These were the days before the studies of Wyckoff and Lingg (1926).

At first it was thought possible to prevent this threatening "disease," the result it was believed, of rheumatic fever, by extirpating tonsils, which were considered

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to be the cause of rheumatic fever. But soon two facts emerged. One was that the number of cases of rheumatic fever was not increasing but on the contrary was diminishing. More important was the fact, that whereas rheumatic fever was a disease of youth and did its damage, even to exacting the penalty of death, before the age of 40, the increased number of deaths that had been observed took place not in youth but in the later years of life. These discoveries were supplemented by the fact that life expectancy at birth has moved steadily upward. This interpretation on the increased number of deaths I put forward twenty years ago. It was not accepted at once. Papers were written which, in fact, opposed it. As time has gone on, the facts have amply borne out the correctness of the conclusion. The increase in the death rate was no calamity. Assuming that men must die, the new situation was, in effect, an ideal state of affairs.

This brief recital has critical importance. Unfortunately physicians continue to misunderstand the meaning of the increase in deaths from cardiac disease and continue to speak as if they still dwelt in the 1920's without full understanding of the facts. It goes without saying, however, that no effort should be spared which is directed to assuaging the ravages of cardiac diseases among young people. These ravages in youth, it is now clear, result predominantly from infectious causes, the most important of which is rheumatic fever, and second, syphilis.

Syphilis as a threat to the public health can be dismissed because almost everything is already known which needs to be known to prevent its occurrence and to facilitate its cure. To achieve complete control of venereal diseases what is required now is the spread of information, removal of prudery, firmness of purpose, and clear intelligence, both in the public and in the medical profession. Like typhoid fever, syphilis can now be successfully coped with by physicians, but it is desirable to continue to study the mechanisms of the disease, both to increase knowledge of its nature and in the interests of improving therapeutic procedures.

Rheumatic fever, however, is in a different state. Much knowledge of its bacteriology and of its immunology exists, yet in both directions much still remains to be learned. The epidemiology, bacteriology, and immunology of rheumatic fever deserve further serious and far reaching research. There are still too many cases, but a helpful sign is that it kills fewer patients year by year. Even if no specific form of prevention or of treatment has been found so far, cases may disappear in the way cases of many another infectious disease have disappeared. Why these diseases are disappearing is unknown, but there is a belief, vague no doubt, that in some way improvement in public nutrition and in housing underlies the change. Both have improved, but no one would seriously contend that enough has been done or that an ideal state has been reached.

To solve the problem of the incidence and cure of rheumatic fever is a challenge to scientific intelligence. Fortunately or unfortunately it has not been customary to continue to study diseases after they have ceased to exist. The sweating sickness, for

example, is not being investigated, nor, for that matter, many a jungle fever. And yet, while so many persons are still afflicted with rheumatic fever, energy, clearly, must be devoted to attempting a better understanding of the infection. It is unnecessary to point out that the equipment of admirable institutions and the service of important bacteriologists and immunologists and epidemiologists continue to be devoted to the study. However, devastating as rheumatic fever is, it occasions, relatively, an unimportant number of deaths among the total number resulting from diseases of the heart and of the circulation.

It would be rash to profess to know at what age a man must die. The view is still usual that the duration of life is not to be expected to exceed 100 years. But it is necessary to attempt to understand the conditions under which death comes. The facts seem to be that most people die from some form of cardiac or vascular disease, and that deaths from these two causes continue to increase in number. A much smaller number of persons die of cancer. Other maladies take, each, a relatively small toll. Renal diseases may be considered in the class of cardiac and vascular diseases.

If death from such ailments occurs at about the time expected, many say: "If this is inevitable, why is it necessary or even desirable to do anything? Why should researches be undertaken when the outlook is hopeless?" Reflection suggests, however, that "to do something" can have value. It is not as if a person died suddenly at an appointed hour. There is usually a preliminary, sometimes a long drawn out, increase in disability, and this disability is not without cost—psychologic cost, economic cost, social cost. The fact is that dying, even if it takes place at 70, is merely the final phase of a process that begins much earlier, perhaps twenty years or more earlier, at the end of the so-called metabolic plateau.

It is unnecessary to put a fine point on this issue; birth, growth and death represent no fixed natural boundaries and may turn out to be simultaneous processes. But the period after the plateau stretches out some twenty-five to thirty-five years, during which years, obvious, visible, and progressive degeneration takes place. It is not known to what degree some of the occurrences during these years are inevitable, nor whether by a better insight in the process called aging, suggestions cannot be made to retard or prevent this slow degenerative process or in any event to pack it all into a last few years or even months. Untold suffering may then be prevented. It is well known that death often seems to come suddenly, the preceding period having been free, apparently, from ailment. It must be asked, however, whether this is possible, whether it can be true that nothing has been going on. There is enough implied here to point to the possibility of researches that may have significant value.

Incapacitating cardiovascular ailments occur in the later years of life when knowledge and wisdom come into their own, in the years of intellectual and social maturity. Unless men possessing the qualities of elder statesmen are available, the whole of society can be the poorer. It will certainly be the poorer if the advantages which have been gained from the accumulation of a lifetime of experience are sacrificed to inactivity because of unnecessary affliction and incapacity.

The problem toward the end of life, then, is to understand better the nature and the mechanism of cardiovascular and renal change, and through better understanding to cope successfully with tantalizing disabilities.

The blood vessels in different regions and organs of the body, quite aside from the differences between the greatest and the smallest ones, have all long been known to be extremely varied in structure. All of them clearly undergo appropriate evolution with age. In similar fashion, the systematic differences among the nerves to the organs and the blood vessels are all but unknown. From the point of view of general functioning, what is known about the nerves is

known in briefest outline only. Knowledge of the mechanism of draining away used up products by the lymphatic system can not be said to be in an advanced state. Not only is knowledge far from complete in reference to the wear and tear of natural living, but also in respect to those superimposed events—the accidents of diseases. These accidents have been no more than fitfully analyzed. In many maladies not even a classification of the varieties so clearly existent has been undertaken.

In an outstanding fashion, this is the situation in arterial hypertension. If so central a manifestation of the functioning of the whole cardiovascular system as the blood pressure is considered, it should be recalled that little more is known of the deviations, normal and abnormal, than the existence of a few probable normal levels characteristic of children, young persons, adults, and the aged. But the rules which nature follows in adjusting systematic changes in these levels are far from completely apprehended, nor is it known whether human beings, men and women separately, exhibit characteristic forms in the evolution of hypertension from birth to death. Only this is known—that it is possible in some persons to correlate certain morbid phenomena with certain levels, low or high, of the blood pressure.

Knowledge about blood pressure is neither adequate nor is it thoroughgoing, and it is only a single—perhaps not necessarily the most important—circulatory problem. There are also such maladies as thromboangiitis obliterans and Reynaud's disease. If, as is now regarded as possible, sex has a bearing on the occurrence of several of these maladies, an additional chapter is added to the opportunities for systematic investigation.

In passing quickly over a catalogue of the mechanisms and the maladies which are incompletely known, such a catalogue must necessarily be limited by the failure of the creative imagination to foresee what only advancement in learning will disclose. In these disclosures will lie, naturally, the insight necessary to undertake further advances.

It has already been said that the heart is predominantly a muscular structure. Following Mall, important investigations have been made of the gross structure and of the layers of which the muscle mass consists. These studies need confirmation and amplification. Something of the microscopic anatomy of the heart is known and something also of the changes which take place in that anatomy with time. Something is known of the changes in so basic a function as the utilization of energy (oxygen) within a life time, but this is known only in a single species of animals, fox terriers, the hearts of which possess a different structure from that of human beings, and the lives of which are relatively short. Even less is known of the nutrition and the ordinary living conditions of the human heart muscle.

Steps have, however, begun to be taken to ascertain how muscle works during contraction. It is known that myosin is the chief protein constituent of heart muscle. On this protein the business of bringing about muscular shortening no doubt depends. It is of first rate importance, therefore, to learn about this in detail, not only in health and in disease, but also—and this phase should always be kept in mind—in the evolution characteristic of aging. Myosin is a large molecule. It has the ability to fold and to unfold, and through this change in shape is undoubtedly concerned with the chief function of muscular contraction. It is, indeed, the very form and function of contraction which seem most subject to change with age. Little if anything more is known than has been briefly stated, and yet, although it is to put relative significance out of focus to speak of predominance, it is worth insisting that on the function of contraction the organism depends as a going concern.

At this point a consideration of the relation of therapeutics may enter. It is desirable to direct treatment to one of several ends: among those on the structural side,

(1) to delaying or revising preventable alteration in the walls of the vessels, (2) to improving the quality of contraction, (3) to alleviating distress in situations of elevated blood pressure; and on the psychologic side, to treating the numerous ailments which have their origin in the cardiovascular domain. What has just been said about contraction suggests a matter of further importance. As the mechanism of the contractile act becomes better known, precision becomes possible in adapting therapeutic agents to derangement in that mechanism or in creating new ones. Specificity, as this has come to be understood in immunology and in the development of antibiotic remedies, may have a meaning here. Trying to understand the mechanism in terms of the therapeutic agent would illuminate the whole of this problem. Cloetta must have had an insight into this process when he spoke of digitalis as having a surface function, a lubricant perhaps. This certainly is a most important direction for research.

It is necessary to repeat that only the barest beginnings have been made in understanding the process of contraction. Under what intimate conditions, precisely, contraction takes place is unknown, and yet this is the function which the physician professes to influence when he attempts to apply therapeutic procedures. The object, of course, is to do good. How to estimate improvement in long drawn out ailments is still a procedure not satisfactorily worked out but improvement may be so apparent as to render further proof entirely unnecessary.

The nutrition of cardiac muscle, as of other tissues and organs everywhere, clearly depends on the constitution and state of the walls of the capillaries and small vessels of the heart. They become chemically adapted, it seems, to the very substances which pass through them. The state of the capillaries has importance, for through their walls pass in and out the substances which help to maintain their proper living and the functioning of the muscle fibers which they supply. (This is a conception with which Edwin J. Cohn has dealt in discussing certain specific interrelations between enzymes in the plasma and in the red cells [*Blood*, 1; 5–6, 1946] and also in connection with the dynamic equilibrium between plasma proteins and the tissues which give rise to them [*Proc. Am. Philos. Soc.*, 88; 162–163, 1944].) If the structure is faulty, the transfer of substances suffers. Here the structural adaptation need be no more than purely chemical, far short of being miscroscopic.

It is known that the walls of vessels in many locations change continuously and indeed "normally" throughout life. So also do the walls of the vessels of the heart. A full description of the number of vessels in the walls of the two ventricles especially and these numbers at different times of life is important but incompletely known. Gross began this study. The reasons for the relative changes in number in the walls of the auricles and ventricles and the rules which govern their disappearance are unknown. What happens in the walls of the disappearing vessels requires much more thoroughgoing study than has been devoted to them. In the direction of understanding arterio- and atherosclerosis, the lesions in the aorta of a rabbit to which substances like cholesterol have been administered seem only a rough and most inadequate first approach to an analysis of the course of events in the small vessels of the human heart. Such investigations as have been undertaken are no more than a beginning.

In the course of these remarks, no mention has been made of a variety of researches which attempt to appraise the efficiency of the circulation. These researches have not been mentioned because, although they throw light on whether the system as a whole is working in a sound fashion, they do not disclose derangement at the "center" of the system itself. The ability to make estimations of such derangement is sedulously to be cultivated. The reference here is to such manifestations of circulatory performance as the cardiac

action current discloses, as this is documented in electrocardiograms, and in such studies as alterations in the respiration insofar as these indicate malfunction of the circulation. I refer also to estimations, both in health and disease, of the volume of blood which is expelled from the heart at each contraction and of the total volume ejected in a minute, as well as measurements of how fast the blood stream flows.

What has been said of the vessels, more especially of the arteries of the heart, is applicable also to all the blood vessels of the body. In considering the blood vessels, the fact should be taken into account, as mentioned already, that everywhere in the body—in the brain, in the liver, in the kidneys, in the eyes, in the long vessels of the extremities—the intimate structure differs not only from one location to another but differs also at successive periods of life. Each vessel changes, in short, and does so according to a pattern of its own and in relation to other vessels. These changes should be understood, as well as whether the changes dispose to various diseases, with many of which physicians are already familiar.

Violent changes in the level of the blood pressure characterize a disease, probably several diseases, now called arterial hypertension, which I have already mentioned. The reason for the occurrence of the ailment is obscure. The ingenious operation to improve this state, introduced by Dr. Smithwick of Boston, benefits many patients, but improvement does not necessarily mean understanding the nature of the underlying process. This situation is similar to removing the appendix in appendicitis and "curing" the disease. Patients are relieved; no more may be necessary. But eliminating a disease, appendicitis, cannot be regarded as equivalent to understanding its mechanism. Whether surgical treatment of such an ailment as arterial hypertension is to be regarded in a similar light requires reflection.

This, in the most general fashion, is a way of thinking of varieties of research that need to be and can now be undertaken in attempting to understand better the operation of the cardiovascular system. Obviously there is much to be done. Much energy must still be devoted to analyzing the changing and faulty mechanisms in this most important group of human ailments. The investigations which have been undertaken have been sporadic and, although in many cases ingenious, have been limited in scope and in intensity.

In the field of cardiovascular disease there is room for the exercise of the best capacities of many men. Even if little has been done, even if facilities for doing what can be done do not exist, even if men capable of mastering the problems which are here so briefly suggested have not yet been trained, even if scientific means still need to be devised to carry on useful studies—at least a beginning can be made.

When it is known how a muscle contracts, how its function changes with time, how the arteries differ, and under what circumstances arteriosclerotic, atherosclerotic, and perhaps other basic changes take place, the means of influencing these changes can be understood. Then the means will be looked for, rationally, to influence morbid processes.

For philanthropic and scientific associations, like the New York Heart Association, for example, or the Life Insurance Medical Research Fund, to undertake such problems of research as I have suggested is not altogether a new adventure. To undertake or to supervise such research has usually been regarded as the business of a medical school or of an institute for research, but that is not necessary. If philanthropic and scientific associations find that existing institutions do not initiate necessary research because they do not have the facilities or the financial resources for conducting such important and difficult labors, or are lacking in the imagination requisite for valuing the needs correctly—then the time has come for another group to devote itself to this service. Academies have set precedents for undertaking novelty before!

The social disability resulting from cardiovascular aging is vast, affecting, as it does, most of mankind. The amount of amelioration which can conceivably be brought about is equally vast. It seems incredible that a program of study so nearly related to the closest interest of men should fail in stimulating the imagination of people to come to the support of the undertaking.

Summary

Cardiovascular diseases are responsible for more deaths than any other cause, and for an increasing number of deaths. These deaths, however, take place in the later years of life, and are connected with the fact that more people now live to be old. Despite the importance of cardiovascular diseases, only the barest beginnings have been made in the study of the heart and blood vessels—as they function normally, in disease, and with approaching age. When it is known how a muscle contracts, how its function changes with time, how the arteries differ, and under what circumstances such basic changes as arteriosclerosis and atherosclerosis take place, the means of influencing these changes can be understood, and the means of influencing morbid processes can be sought. While it is usually the medical school or research institute that undertakes such a research program, the philanthropic association or scientific institution could assume the responsibility just as well.

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The Length of Life in Ancient Greece

J. LAWRENCE ANGEL

MUCH RESEARCH HAS BEEN CARRIED OUT ON THE INCREASE IN LIFE EXPECTANCY SINCE IMPERIAL ROMAN TIMES, BUT THERE HAS BEEN NO INQUIRY INTO THE POSSIBLE INCREASE IN LONGEVITY, WITH ATTENDANT SOCIAL PROBLEMS, WHICH THE RISE OF CIVILIZATION IN ANCIENT GREECE MAY HAVE PRODUCED. SUCH A STUDY MUST BE BASED LARGELY ON SKELETAL MATERIAL, SINCE NO WRITTEN DATA HAVE BEEN HANDED DOWN FROM PREHISTORIC GREECE. SINCE SKELETAL MATERIAL FROM THE THREE MILLENNIA B.C. IS EXTREMELY SCANTY, AND AGE ESTIMATES BASED ON THIS MATERIAL ARE LIABLE TO ERROR, ONLY A ROUGH APPROXIMATION OF THE CHANGE IN LIFE EXPECTANCY CAN BE MADE. AN INCREASE OF FOUR OR FIVE YEARS SEEMS A CONSERVATIVE ESTIMATE. HOWEVER, THIS SMALL BUT SIGNIFICANT INCREASE IN LIFE EXPECTANCY PROBABLY DID NOT AFFECT THE AGE COMPOSITION OF THE POPULATION ENOUGH TO CREATE SOCIAL PROBLEMS SIMILAR TO THOSE OF TODAY, PARTLY BECAUSE OF THE ACTIVE SOCIAL ROLE OF OLD PEOPLE IN ANCIENT GREECE.

THE concern of students of population and the medical profession over results of the recent great increase in length of life in the culture centers of western civilization springs at least partly from the idea that this population change is something new. As the cause of increased longevity such authorities as Dublin (12), Dublin and Lotka (11), and Thompson (24) stress disease prevention and emphasize the medical and social problems, which gerontology must deal with, attending the increase in the percentage of old people. Likewise Pearson (18), MacDonnell (15), Pearl (17, pp. 84–94), and Richardson (19, pp. 231–236) have all demonstrated the increase in life expectancy which has occurred since imperial Roman and Medieval times. However no one has previously inquired how far the rise of civilization prior to Roman times may have increased life expectancy or given rise to social problems like those of the present day.

Greek skeletal material ranging from before 3000 B.C. to 1300 A.D. suggests a rise in the average age at death of adults (over 17 years old) between the third millennium B.C. and historic times (1, 5), as is shown in tables 1 to 3. This conclusion is based on individual estimates of age at death, made largely from degree of suture closure according to criteria of Todd and Lyon (26, 27), plus consideration of bony atrophy or hypertrophy and the extent of dental deterioration. However the condition of teeth improved somewhat with the achievement of classical civilization in spite of increased longevity (2), so teeth were used only to confirm age estimates. Since Todd and Lyon stress great individual variability in suture closing, and there are other sources of error also, the interpretation of the age estimates requires close scrutiny of the data.

Since the 384 adult skulls of both sexes cover a time span of over 4,000 years, the material is obviously too scanty at all periods. The single infant skull and 30 children's skulls examined allow scarcely any estimate of the effect of pre-adult deaths on life expectancy. The skeletons of about 175 newborn Athenian infants from a single Hellenistic well deposit (Angel, 3, pp. 311–312) seem to be connected with specific economic difficulties and perhaps the siege by Sulla, since remains of dogs were also excavated from this same well by D. B. Thompson of the Agora excavations staff. This finding gives no basis for infant death statistics, though it adds to historical evidence brought out by Tarn (23, pp.

Dr. J. Lawrence Angel received his A.B. degree from Harvard in 1936, and in 1942, his Ph.D. in physical anthropology. From 1939 to 1941 he was an assistant in anthropology at Harvard. During the war he taught the courses of professors on war leaves of absence—at the University of California in 1941–1942, and at the University of Minnesota in 1942–1943. Since that time he has been an associate in anatomy and physical anthropology at the Daniel Baugh Institute of Anatomy of the Jefferson Medical College of Philadelphia. His chief field of interest concerns human biology and its relation to anthropology, history, and the medical sciences. His research subjects include the anthropology of Europe, especially Greece.

The material presented in this paper was studied in 1937–1939 on a field trip to Greece, supported by fellowships from the departments of anthropology and classics at Harvard University.

92–94) and Cameron (10) that infant lives were often lightly regarded in ancient Greece, at least until after the decline in the birthrate and the humanistic "revolution" of late Hellenistic and Christian times.

Among the adults, the age distribution inevitably must be greatly affected by soil conditions, which preserve only the toughest skeletons for survival for study. Often excavators screened the material still more drastically by discarding the more broken of surviving skeletons. Such screening apparently greatly reduces the relative frequency with which female skeletons and both old and immature skeletons are found. Hence the material available for trustworthy comparison is in the age range from 18 to about 40, the period when the least change in life expectancy would be anticipated. In the face of these limitations it is not surprising that the observed increase in average age at death is small compared to the modern increase.

Table 1 shows a slight increase in the middle-aged and the old adult categories of each sex separately. Table 2 shows that suture closure percentages for the combined sexes confirm this slight increase. Table 3 gives the mean change in length of life, estimated from broad age categories, from suture closure alone, and from five-year age groupings. From table 3 it is clear that the increase from the third millennium B.C. to Classical times is eight years for males but only four years for females. Thus the average for the combined sexes is a six-year increase, which is statistically significant. The data were seriated by five-year age groups to allow calculation of probable errors.

TABLE 1. DISTRIBUTION BY AGE GROUP OF GREEK SKULLS (FOUND ON THE MAINLAND) FROM DIFFERENT PERIODS

		Neolithic -Early Bronze (3500–2000 B.C.)	Middle Bronze (2000–1400 B.C.)	Late Helladic III (1400–1150 B.C.)	Cephallenia, Sub-mycenean* (1200–1050 B.C.)	Early Iron Central Greece (1150–650 B.C.)	Classical Period (650–150 B.C.)	Roman Period (150 B.C.–450 A.D.)	Byzantine Period (450–1300 A.D.)	Total Series
Males										
Subadult	(19)	7.4%	0 %	0 %	0 %	3.7%	1.9%	0 %	3.2%	.8%
Young adult	(28)	55.6	43.5	43.9	33.3	37.0	26.9	27.8	51.6	39.4
Middle-aged adult	(46)	33.3	52.2	48.8	63.4	59.3	61.6	66.6	42.0	54.6
Old adult	(66)	3.7	4.3	7.3	3.3	0	9.6	5.6	3.2	5.2
Number of skulls		27	23	41	30	27	52	18	31	249
Females										
Subadult	(19)	17.6	23.1	18.5	9.1	18.7	11.1	0	11.1	14.1
Young adult	(28)	64.7	53.8	70.4	63.6	50.0	55.6	80.0	66.7	63.0
Middle-aged adult	(46)	17.7	23.1	11.1	27.3	31.3	29.6	20.0	22.2	22.2
Old adult	(66)	0	0	0	0	0	3.7	0	0	.7
Number of skulls		17	13	27	11	16	27	15	9	135

* The Cephallenia skulls are geographically rather than chronologically separated from the first subperiod of the Early Iron Age of Central or Circum-Isthmian Greece.

TABLE 2. DEGREE OF CLOSURE OF SAGITTAL SUTURE ON GREEK SKULLS (FOUND ON THE MAINLAND), FROM DIFFERENT PERIODS. (BOTH SEXES COMBINED.) CORONAL AND LAMBDOID SUTURES SHOW SIMILAR SLIGHT INCREASE IN CLOSURE BY THE CLASSICAL PERIOD

	Neolithic -Early Bronze (3500–2000 B.C.)	Middle Bronze (2000–1400 B.C.)	Late Helladic III (1400–1150 B.C.)	Cephallenia, Sub-mycenean (1200–1050 B.C.)	Early Iron Central Greece (1150–650 B.C.)	Classical Period (650–150 B.C.)	Roman Period (150 B.C.–450 A.D.)	Byzantine Period (450–1300 A.D.)
Open (age 20)	59.5%	44.5%	42.7%	35.2%	38.1%	28.0%	36.4%	34.2%
Beginning (24)	13.5	22.2	20.6	10.8	21.4	22.7	9.1	23.7
Medium (29)	16.2	16.7	8.8	21.6	19.1	20.0	24.2	18.4
Pronounced (33)	8.1	8.3	14.7	27.0	14.3	17.3	21.2	18.4
Complete (60)	2.7	8.3	13.2	5.4	7.1	12.0	9.1	5.3
Number of skulls	37	36	68	37	42	75	33	38

Estimates of the actual age at death vary, as seen by comparing the average age at death between 3500 B.C. and 1300 A.D. as calculated by different methods (table 3). The age estimate from suture closure percentages directly is eight years lower than the estimate made from broad age categories. Since the estimate with skulls seriated in five-year groups really has 20 years of age (the 18–22 year age group) as its lower limit rather than 18 years, the resulting figure may be slightly lower than the estimate made from broad age categories, though at least six or seven years above the suture closure estimate. Estimating age from the state of the pubic symphysial face is more accurate than from suture closure (25). The average age at death calculated from the pubic symphysial face is 35.5 years for 22 males and 27.0 years for 16 females of all periods (4, p. 72), giving 31.9 as the average for both sexes. This figure shows the suture closure estimates to be four or five years too low, but it does not show how far the general age estimation of skulls may exceed the true value since soil and archaeologic selection work more stringently on pelves than on

TABLE 3. MEAN AGE AT DEATH AT DIFFERENT PERIODS ESTIMATED BY THREE DIFFERENT METHODS FROM GREEK SKULLS

	Neolithic -Early Bronze (3500–2000 B.C.)	Middle Bronze (2000–1400 B.C.)	Late Helladic III (1400–1150 B.C.	Cephallenia, Sub-mycenean (1200–1050 B.C.)	Early Iron Central Greece (1150–650 B.C.)	Classical Period (650 B.C. 150 B.C.)	Roman Period (150 B.C.–450 A.D.)	Byzantine Period (450–1309 A.D.)	Total Series
Estimate from age categories of table 1									
Males	34.7 yrs.	39.3 yrs.	40.0 yrs.	40.7 yrs.	38.3 yrs.	42.6 yrs.	42.1 yrs.	36.5 yrs.	39.8 yrs.
Females	29.6	30.1	28.3	32.1	31.9	33.7	31.6	31.0	31.0
Both sexes	32.1	34.7	34.1	36.4	35.1	38.1	36.8	33.7	35.4
Estimate from closure of sutures (cf. table 2*)									
Both sexes	23.7	26.8	28.0	27.0	26.8	29.1	27.8	27.4	27.4
Estimate from seriation by 5-year intervals									
Both sexes	31.8	34.9	34.8	35.4	35.5	37.7	38.5	34.9	35.5
Probable error	.77	.93	.88	.84	.93	.78	1.09	.96	
Number of skulls	44	36	68	41	43	79	33	44	384

* In addition to the closure of the sagittal suture, shown in table 2, the mean ages shown in table 3 are also calculated from the degree of closure of coronal and lambdoid sutures. The ages for the five degrees of closure of the coronal suture are 22, 25, 28, 38, and 65; of the lambdoid suture, 23, 26, 30, 38, and 65.

skull vaults and might eliminate more old ones.

Such selective factors almost certainly increase the sex difference in age at death. But the epigraphic data published by Mac-Donnell (15) agree with Greek skeletal material in suggesting that in ancient civilizations female life expectancy was lower than the male rather than greater as is true today.

A complete picture of the increase in length of life in ancient Greece demands calculation of life expectancy at different periods as in figure 1. The curves for the ancient Greeks are derived from seriation of the crania in five-year groups with no correction attempted for lack of skulls in the 60 to 100 year age range. Hence expectancies must be too low as a whole.

Correction for lack of infant and child skeletons is based on publications of thoroughly excavated cemeteries plus the age distribution of the 30 child skeletons of all periods combined. These nonadults are distributed in the proportion of 17 skeletons at 5 years of age, 9 at 10 years, 2 on the edge of adolescence plus 2 in the adolescent age group (13 to 17). These 30 skeletons must be used in estimating the proportion of children's deaths at all periods.

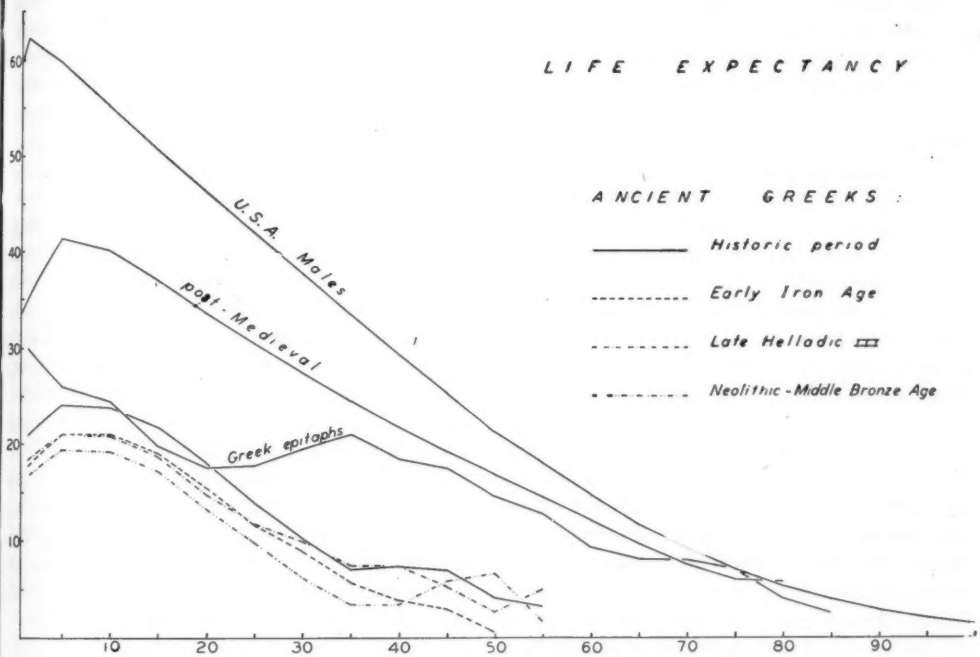

FIG. 1. LIFE EXPECTANCY CURVES TO COMPARE CONDITIONS IN ANCIENT GREECE WITH POST-MEDIEVAL EUROPE (17TH CENTURY HALLE) AND MODERN AMERICA (MALES).

The Greek curves are based on about four hundred skulls seriated in five-year groups and supplemented by data on nonadult deaths from carefully excavated ancient cemeteries. The curves are not corrected for effects of "archaeologic selection" in eliminating fragile skulls including the aged in general. However, the curve based on Greek tombstones from the late historic period partly compensates for this lack of correction. It is taken from data in Richardson (19) and may be biased in the subadult-young adult range by cultural factors. The post-Medieval (17th century Halle) and modern curves are from Dublin and Lotka (11).

Robinson (20, pp. 146–170) published detailed data from the cemetery at Classical Olynthus, showing that jar burials of infants, or *enchytrismoi*, make up 28.3 per cent and other child graves, 21.4 per cent of the 584 graves where the approximate age of the skeleton was determinable. These percentage figures are used for the proportion of infant to child deaths for all the periods studied. The same figures give the proportion of nonadult to adult deaths (290:294) for the life expectancy curve of the Classical period.

Though the total child burials at Olynthus amount to 49.7 per cent, the proportion is at least 55.0 per cent of 151 burials for six Middle Helladic (or Middle Bronze Age)* cemeteries of early second millennium B.C. date. Frödin and Persson (13, p. 356) point out that in Late Helladic III times (1400–1150 B.C.) children were buried in cist tombs rather than in the more typical and more usually excavated chamber tombs. Thus for the Late Helladic period the percentage figure of 12.8 for child burials out of 633 burials in the cemetery at Asine together with the Heraeum is no more reliable than the figure of 90 per cent child burials found in ten cist tombs at Asine. Hence the proportion of children in Late Helladic III times has been estimated arbitrarily at 52 per cent, or the average of 12.8 and 90 per cent.

Though at Asine, Frödin and Persson (13, p. 422) note 67.4 per cent child burials out of 43 graves of Early Iron Age date (1150–650 B.C.), this percentage is so high that they speculate that adults may, for the most part, be buried elsewhere. Hence an arbitrary figure of 55 per cent is taken as the proportion of child deaths in the Early Iron Age period. This whole procedure is conservative, since the infant death rate in prehistoric times was almost certainly far greater than in Classical times, and no separate correction has been attempted for this.

Some improvement in general health accompanied the increase in length of life between prehistoric and historic times. The skeletal material shows an increase in body size, a probable reduction in arthritis, and a probable improvement in teeth with the rise of civilization in Greece (4, 2). Archaeologic remains of houses, aqueducts, and drains together with historical evidence about food and that gathered from excavations (Angel, 4, 5; compare Michell, 16) show improvement in living conditions and in nutrition. Singer's estimate (22, pp. 84–115) of the Hippocratic school in Greek medicine shows precision of medical observation in early historic times which must have far exceeded that of the third and second millennia B.C. This whole picture favors the hypothesis that a general improvement in hygiene and living conditions led to an increase in life expectancy. The conservative curves in figure 1 suggest that the increase was of at least four or five years at any age period, but probably the actual changes in old age, childhood, and especially infancy were much greater.

To be compared with these curves showing life expectancy among the ancient Greeks of Classical and pre-Classical times, is the curve derived from 327 tombs of Roman date (fig. 1). These tombs were found on the Greek mainland and have been selected out of a total of 2,022 with Greek burial inscriptions on the tombstones, found in the whole Mediterranean area by Richardson (19, pp. 231–260). This latter curve, based on burial inscriptions, shows two disturbing peculiarities, noted also by Pearson (18) on similar material. The more definite of these peculiarities results from lack of tombstones set up for infants. The other is the apparently colossal subadult and early adult death rate. Though some of this excess may be real, it does not fit the evidence from the skeletal material. It is plausible that the age of death may have been recorded much more often on burial

* Korakou, Zygouries, Gonia, the Heraeum (Blegen, 6, pp. 100–103; 7, pp. 39–74; 8; 9, pp. 30–50), Asine (Frödin and Persson, 13, pp. 115–146, 342), and Eutresis (Goldman, 14, pp. 221–226). At Middle Helladic Asine, child burials ran as high as 72 per cent, and the excavators thought, therefore, that the "adult" cemetery must have been located elsewhere, outside the town limits. This is unproved.

inscriptions of those dying unusually young (and perhaps also unusually old) than in most cases.

If the life expectancy curves obtained from the study of skulls are corrected from the data after middle age taken from burial inscriptions, life expectancy in ancient Greece after childhood may almost have equalled that in postmedieval Europe, though remaining far below the modern level.

It is clear that a small but definite increase in length of life accompanied the rise of civilization in ancient Greece, just as a greater increase has accompanied the emergence of the atomic era. It also seems a sound inference that this longer life, with better general health and an expanding and mixed population, in early Classical Greece helped to produce abler people with a longer period of learning and greater creative ability than in prehistoric times. But although life expectancy may have increased from a really low level to one even above that of Medieval Europe, life expectancy in ancient Greece was so far below the modern level that there can never have been enough chronologically old people to give rise to problems as difficult as those of the present.

However aging is a cultural as well as a chronologic process. The lowered birthrate and smaller families which formed part of the disturbed balance of Greek society in the first century B.C. (Tarn, 23, pp. 92–94) must have produced a relative increase in numbers of the culturally "aged" which paralleled, on a small scale, the present increase in old people but did not lead to equivalent problems. It may be asked: Why not?

Pearson (18) and Pearl (17, p. 94), among others, develop the hypothesis that the relatively high life expectancy in old age (especially as contrasted with that in youth) seen in curves made from ancient Mediterranean epigraphic data tends to exceed that in modern times because of rigorous selection at earlier ages. On this basis, the old people of ancient Greece should have been tougher than in modern times. Yet the ancient Greek greatly feared the onset of old age (Richardson, 19, pp. 1–14, 59–71) mostly because of the loss of bodily vigor.

Perhaps partly to compensate for this attitude toward his own aging, the ancient Greek combined almost primitive respect for the aged with insistence on certain social obligations. Old people were expected to show superior judgement and ability, to enjoy social intercourse more, and especially to fill such magisterial and political positions as in councils of elders (Richardson, 19, pp. 15–43). This is closer to the behavior pattern of the aged in noncivilized societies, as described by Simmons (21), than to the modern pattern.

Apparently the role of the aged in early Greece carried more responsibility, activity, and hence satisfaction than in the present shifting society. Hence it would not be likely that the relative increase in percentage of old people, which logically must have accompanied the small families and falling birthrate of late Hellenistic Greece, would actually have added appreciably to the complicated social and economic problems of that time. Though literature and art of this historical period perhaps show an increased interest in old age, Richardson (19, p. 43) brings out the rustic rather than critical Hellenistic depiction of old people. Since the Greeks did not have, even in their period of youthful expansion, any tradition of retirement as in modern civilization, the aged simply continued to participate actively in the life of the times, though in somewhat specialized roles.

Summary

1. From the third millennium B.C. to classical times (650–150 B.C.), longevity in ancient Greece increased slightly but significantly, as shown by study of skeletal remains.

2. The data are too scanty to determine the exact change in life expectancy, since skeletal remains of really old people and of children are extremely inadequate in number.

3. However, the change in age composition of the population was not great

enough (nor life expectancy of the historic period near enough to that of today) for social problems of old age to arise in modern form. The aged continued to participate in the life of the community, through the respect attached to their judgment and opinions.

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The Oral Glucose Tolerance Test in Old Men

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THE ORAL GLUCOSE TOLERANCE TEST HAS BEEN WIDELY USED FOR MANY YEARS TO DETERMINE THE EFFECTIVENESS OF THE MECHANISM OF CARBOHYDRATE METABOLISM IN THE BODY. HOWEVER THERE HAS BEEN NO GENERAL AGREEMENT EITHER AS TO THE METHOD EMPLOYED IN THE TEST OR AS TO THE MEASURING OF THE RESULTS, WHICH ARE EXCEEDINGLY VARIABLE IF THE TEST IS REPEATED SEVERAL TIMES. DR. HORVATH, MR. WISOTSKY, AND DR. CORWIN HAVE MADE A STUDY OF ORAL GLUCOSE TOLERANCE IN A GROUP OF 24 MALE PATIENTS OF A STATE MENTAL HOSPITAL, WHOSE AGES RANGED FROM 60 TO 67 YEARS. ALTHOUGH THE CARBOHYDRATE METABOLISM OF THESE MEN WAS NOT SIGNIFICANTLY IMPAIRED, THE VARIABILITY IN REPEAT TESTS PREVENTED A TOO-FINE INTERPRETATION OF THE TREND TOWARDS A SLIGHT DIMINUTION OF TOLERANCE.

THE glucose tolerance test is the simplest procedure available for studying the integrity of the entire mechanism of progressive carbohydrate metabolism from ingestion through absorption, storage, availability, and oxidation. Its extensive use during many years is evidence that it is fulfilling a need. However, despite the vast amount of work utilizing the oral glucose tolerance test, there is no general agreement either as to technique or as to interpretation of results. A more serious deficiency is the lack of information regarding the stability of the test in the individual subject under comparable conditions. In addition, the response of the aging organism to this test has received only cursory attention. As a part of general investigations being conducted on psychotic patients in the age range of 60 to 70 years, a study was made of the oral glucose tolerance in such a group of individuals.

METHOD

Twenty-four male patients of a state mental hospital, whose ages ranged from 60 to 67 years, were used as subjects. On 12 of these patients at least two tests were made within a period of three months. A single test was given to the other 12 sub-

TABLE 1

Subject	Diagnosis	Hospitalization, Years	Age, Years	Weight, Kilos
1	Alcoholic psychosis, other types	11 yrs., 9 mos.	63–	47.3
2	Psychosis resulting from other mental, etc., disorders; other somatic diseases	18 yrs., 10 mos.	64–	64.3
3	Dementia praecox, simple type	14 yrs., 8 mos.	67–	72.1
4	Dementia praecox, paranoid type	11 yrs.	64–	72.9
5	Psychosis with cerebral arteriosclerosis	8 yrs., 5 mos.	65–	80.9
6	Manic-depressive psychosis, depressive type	10 yrs., 10 mos.	62–	69.3
7	Dementia praecox, paranoid type	7 yrs., 10 mos.	65	53.2
8	Cerebral arteriosclerosis with psychosis	12 yrs., 4 mos.	66–	83.6
9	Dementia praecox, hebephrenic type	41 yrs., 11 mos.	66–	59.0
10	Psychosis with mental deficiency	22 yrs., 2 mos.	60–	43.6
11	Post-traumatic mental deterioration	11 yrs., 8 mos.	64–	56.8
12	Psychosis with mental deficiency	4 yrs., 10 mos.	64–	95.4

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Mr. R. Wisotsky graduated from Harvard University in 1943, and held a research assistantship at the Metropolitan State Hospital at Waltham, Massachusetts before entering the Army. He is now in medical school at Boston University.

Dr. William Corwin received his M.D. degree at Tufts College Medical School in 1932. He has been assistant superintendent of the Metropolitan State Hospital, a research fellow at the Fatigue Laboratory at Harvard, and an instructor in psychiatry at the Boston University School of Medicine and at Tufts College Medical School. During the war he was attached to the medical corps of the AAF. Dr. Corwin is a diplomate in psychiatry and neurology of the American Board of Psychiatry and Neurology. He is an attending physician in neuropsychiatry for the Veterans' Administration, and is in private practice of psychiatry and neurology in Springfield, Massachusetts.

The work on this paper was performed at the Fatigue Laboratory at Harvard University and at the Metropolitan State Hospital before Drs. Horvath and Corwin and Mr. Wisotsky entered the Army.

jects; these results are only incidentally included in this report. On one of the first group of subjects (no. 3) eleven additional tests were made, one every eighteen days. The physical characteristics and diagnoses of the first 12 patients are given in table 1. All of these patients were ambulatory and were engaged in various tasks in the institution. None had any evidences of disturbed carbohydrate metabolism.

All blood samples (capillary) were taken on the fasted subject lying quietly in bed. After this control sample of blood was taken, 0.75 gm. of glucose dissolved in water was given per kilogram of body weight. Blood specimens were then taken at intervals of 15, 30, 45, 60, 90, 120, 150, and 180 minutes. Urine samples were also obtained. The sugar content of the blood was determined by a modified Folin-Malmros method (6). Benedict's qualitative method was used to test for sugar in the urine. The glucose tolerance tests were repeated at irregular intervals (table 3). Although the diet of the patients was not standardized, it was the usual institutional diet and varied only to a minor degree from week to week.

The glucose tolerance curves obtained were classified as one of the following four types: I. essentially normal—maximum of 0.19 per cent within one-half to one hour, and a return to basal within one and one-half to two hours; II. storage defect—maximum of 0.21 per cent within two hours and a delayed return to basal; III. flat—peak values under 0.15 per cent for two hours; IV. diabetic-like—peak values exceeding 0.24 per cent and basal level not reached prior to two and one-half hours after ingestion. These criteria are similar to those employed by Marshall (8), Nissin and Spencer (11), and Myers and McKean (9).

Results

The mean values for each type of curve are presented in table 2 and figure 1. In 40 per cent of the tests, curves of type IV, the diabetic-like type, were obtained. The next most common curve was type II, occurring in 28 per cent. When the first tests on all 24 subjects were grouped into their various types, the distribution was roughly similar to that obtained from an analysis of all of the tests of the 12 patients tested more than once. A summary of the responses observed on the consecutive oral glucose tolerance tests made on each individual is presented in table 4. Of all the tests, only three were duplicates in the sense that they fell into the same group on all occasions (see figure 2 for patient no. 10). On every subject, at least two consecutive tests were similar, although with additional tests tolerance

TABLE 2. MEAN ORAL GLUCOSE TOLERANCE CURVES OBTAINED ON OLD MEN

Curve Type	Blood Sugar (milligrams per cent) at Intervals								
	Basal	15 min.	30 min.	45 min.	60 min.	90 min.	120 min.	150 min.	180 min.
I Normal	121	142	167	186	182	162	126	106	106
II Storage	119	141	167	183	191	197	171	148	118
III Flat	107	129	140	127	141	144	142	136	117
IV Diabetic-like	130	169	215	241	250	251	209	161	130
Grand Mean	119	145	172	184	191	188	162	138	118

curves that differed widely from each other were obtained. In the last five tests made on patient no. 11, all four types of curves were found (figure 4), the two curves of type IV being remarkably similar. Three additional subjects presented during their testing period at least three different curve types (see figure 3 for the first four tests on no. 7). Sugar was observed in the urine of only two subjects, and that on only one occasion for each.

Two months after the two tests on patient no. 3, a series of eleven consecutive tests, eighteen days apart, was made on the same subject with the following results according to type: III, III, IV, I, I, IV, III, III, I, III, and IV. In this extremely cooperative patient, the pattern observed on the first two tests in the initial series was

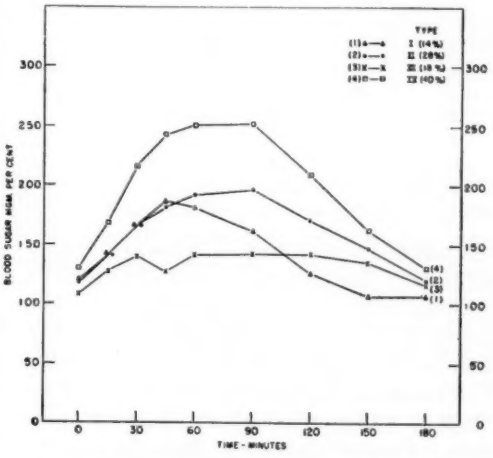

FIG. 1. Types of mean oral glucose tolerance curves obtained in old men.

TABLE 3. TIME INTERVALS ELAPSING BETWEEN GLUCOSE TOLERANCE TESTS

Subject	Number of Tests	Duration of Study Days	Elapsed Time Between Tests	
			Longest Interval, Days	Shortest Interval, Days
1	3	77	49	28
2	6	99	59	2
3	2	61	61	61
4	2	75	75	75
5	3	93	91	2
6	3	77	56	21
7	6	114	56	2
8	3	84	70	14
9	7	96	49	2
10	3	44	42	2
11	5	131	82	2
12	7	99	49	5

repeated, but considerable variation occurred thereafter. Three distinct patterns of response to the same dose of oral glucose were obtained during a series of eleven tests.

Discussion

Adequate studies of the aging process must be concerned with the ability of the individual to maintain a constant *milieu intérieur*. The glucose tolerance test, a common index of regulative efficiency, was employed by us as one means for measuring the reaction of the aged organism to stress. To determine adequately the response to stress it was considered important to perform a number of tests rather than to depend upon a single determination.

The present studies indicate the necessity for a large number of oral glucose tolerance tests, inasmuch as considerable differences in response were noted on successive tests. In some individuals (figure 2) constancy of response was remarkable, but in the majority of patients variability was the rule. The inadequacy of single tests for young individuals has been noted by several groups of investigators (3, 7, 9), but none has performed more than two tests. Nielsen (10) has reported notable consistency in repeated tests, but his criteria were not sufficiently stringent. The lack of consistency of blood sugar levels during the oral glucose tolerance test occurs in both young and old individuals.

Table 4. Types of Response Exhibited by Old Men on Repeated Glucose Tolerance Tests

No. of Tests	Type of Response in Twelve Patients											
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11	No. 12
1	II	III	III	IV	IV	IV	IV	II	IV	I	III	IV
2	IV	II	III	IV	IV	IV	IV	II	IV	I	IV	IV
3	IV	II			II	II	II	IV	III	I	IV	IV
4		III					I		IV		II	II
5		I					I		III		I	II
6		III					II		III			IV
7									II			II

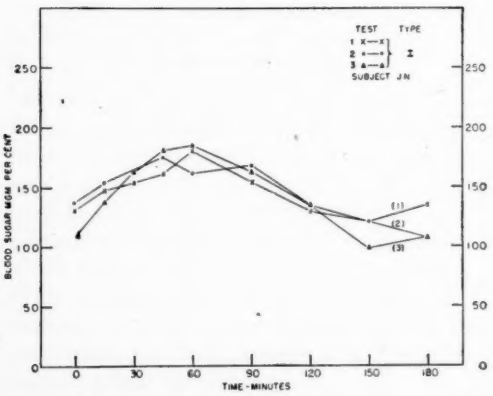

Fig. 2. Three oral glucose tolerance curves in a single subject exhibiting consistency of response.

Primarily on the basis of single tests, a number of investigators (1, 2, 4, 7, 8, 11, 12, 14) have suggested that elderly people have an impaired carbohydrate metabolism. John (7) found only 14 per cent normal curves in the aged, in contrast to 62 and 82 per cent in adults and children respectively. The following average curve from Porter and Langley (12) for 10 individuals in their sixth decade of life is indicative of the type reported on in most of the previously referred-to papers.

Basal	*30 min.*	*60 min.*	*90 min.*	*120 min.*	*150 min.*
145	225	238	245	205	185

Porter and Langley also found sugar in the urine of 4 of the individuals in this aged group. The delay in the curve was postulated as being the result of the physiologic effects of old age. On the other hand, Hoffstatter, Sonnenberg, and Kountz (5) noted

only minor evidences of impaired carbohydrate tolerance in the aged. Furthermore, a repeat oral tolerance test on 40 of their patients indicated that approximately one-half of the curves changed in type. This agrees with our observations, both as to the slight diminution in tolerance observed and as to the variability of the test. It is felt that because of this variability it is practically impossible to judge the degree of impairment of carbohydrate metabolism in aged individuals.

The failure to obtain duplicate curves in older patients may be due to the mixed diet, but Soisalo (13) obtained variations in the tolerance curve even on a standardized diet. Absorption of glucose from the gastrointestinal tract may be responsible for the lack of parallelism in repeated curves. Pancreatic and hepatic reactions to the ingested glucose may also be at fault, but all of these potential factors point out the difficulty and complications in the analysis of oral glucose tolerance curves. The problem is the same for all age groups.

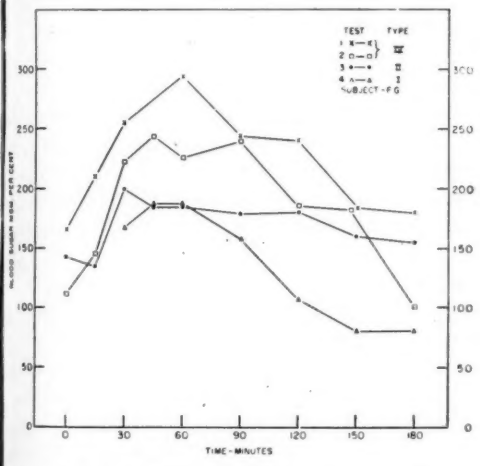

FIG. 3. Four glucose tolerance curves exhibiting several types of responses.

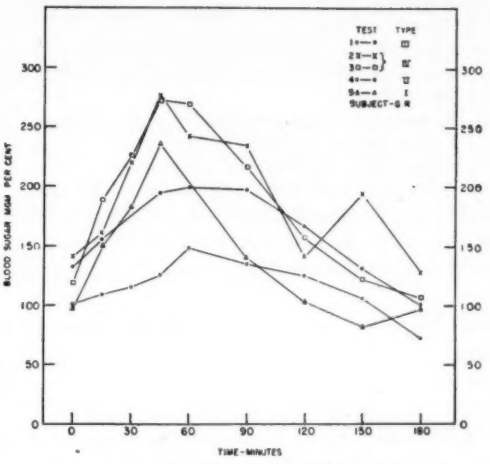

FIG. 4. Glucose tolerance curves exhibiting all types of responses.

SUMMARY

1. There is a notable lack of consistency in the curves obtained on repeated oral glucose tolerance tests. One or even two tests may not be diagnostically significant.

2. The carbohydrate metabolism of men between the ages of 60 and 67 years is not significantly impaired. There appears to be, on the average, a trend towards a slight diminution in tolerance, but the variability in repeat tests makes this interpretation questionable.

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Program of Research on Aging of the Skin

E. V. COWDRY, ZOLA COOPER, AND WARREN SMITH

THE INVESTIGATION OF CHANGES IN THE SKIN THAT COME WITH AGE HAS BEEN UNDERTAKEN BY TWO INSTITUTIONS WORKING TOGETHER—THE BARNARD FREE SKIN AND CANCER HOSPITAL IN ST. LOUIS AND WASHINGTON UNIVERSITY. ATTENTION HAS BEEN CONCENTRATED ON THE EPIDERMIS, BECAUSE OF ITS INTERESTING MANNER OF LIFE, BECAUSE IT IS EASILY SUBJECTED TO EXPERIMENTAL CONDITIONS, AND BECAUSE THERE ARE NO BLOOD VESSELS, LYMPHATICS, OR MESENCHYMATOUS ELEMENTS TO BE TAKEN INTO CONSIDERATION IN THE INTERPRETATION OF EXPERIMENTAL RESULTS. THE STUDY HAS BEEN DIVIDED INTO SEVERAL PARTS, INCLUDING AGING OF THE SKIN IN A SINGLE PROTECTED AREA, REGIONAL DIFFERENCES IN AGING, THE INFLUENCE OF AGE ON EPIDERMAL CARCINOGENESIS IN MICE, AND CERTAIN EXTENSIONS TO HUMAN BEINGS OF TECHNIQUES PROVED USEFUL FOR MICE IN THE STUDY OF CARCINOGENESIS.

THE skin is in many respects the most interesting part of the body. To have a good looking skin may determine success in seeking employment or marriage. Cytologists find in the skin many intriguing problems. It is especially the epidermis that captivates them.

Reasons for Concentrating Attention on Epidermis

Over large stretches of the body this outer layer of the skin is about as thick as an average sheet of the typewriter paper called "onion skin," which is sometimes used for carbon copies—approximately 45μ. That is, the epidermis would be invisible if viewed on edge, its position not betrayed by contrast with the background or by light reflected from either surface. In some locations, epidermis is as thick as medium weight typewriter paper (80μ), and in a few places it is still thicker.

Realization of the more obvious conditions of cell life in this thin investment led us, ten years ago, to select epidermis as material for the major cancer research project of Barnard Hospital and for studies on aging. These conditions will be reviewed briefly.

First of all, epidermis is Nature's most effective frontier tissue. In it, life and death are more closely joined than anywhere else. The cells composing the tissue—all probably of one type, ectodermal—are well organized. They stand closely together. The inner cells, next to the underlying blood vessels of the dermis, have adequate supplies. Some of their descendants take up positions nearer and nearer to the external environment. The farther they move in this direction, the more unfavorable their living conditions become, not only as to supply but also in respect to removal of waste. They gradually die, still more closely clasped together, and in such a condition that in death they serve as a protective shield of exceeding thinness, conditioned by the oily secretion of sebaceous glands.

Second, in this frontier as in all others, the inhabitants have duties rather different from those placed internally. They present to the environment defenses not easily crossed. Their primary function is to limit the organism and to protect all living cells (which, of necessity, are aquatic) from harmful changes in their immediate tissue fluid environments. Thus, water must be prevented from direct entry, and, what is equally necessary, must be conserved. Special portals are provided by the ducts of sweat glands for exit of water on occasion. Special nerve endings between the epidermal cells, as well as sense organs beneath the epidermis, inform the body of environmental changes. There is give and take—in fact a lively exchange—between these frontier cells and their more protected

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Dr. Zola Cooper was, until September, 1946, associate pathologist at the Barnard Free Skin and Cancer Hospital in St. Louis, and an instructor in pathology at the Washington University School of Medicine. She is now assistant professor of histology and embryology at the University of Oklahoma. Dr. Cooper received her A.B. degree from Washington University in 1925, her M.S. in 1926, and her Ph.D. in 1929. Her chief fields of research include cell division, cytologic studies in carcinoma, and the experimental production of carcinoma in the use of various chemical irritants.

Dr. Warren Smith received his B.S. from the University of New Hampshire in 1934 and his M.D. degree in 1938 from Washington University School of Medicine. He took his training, in surgery, at Barnes Hospital, at Barnard Free Skin and Cancer Hospital and at the Royal Victoria Hospital in Montreal. From 1942 until 1946 he served in the Navy. Now Dr. Smith is a research fellow at Barnard Hospital.

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comrades. However, the physiology of the epidermal cells remains to date a closed book.

Third, this frontier service imposes many hazards on the cells. More than any other cells of the body, those of the epidermis are exposed to mechanical injury, to extremes of heat and cold, and to radiation from atomic fission in the sun. They are subject to invasion by microorganisms and a whole group of ectodermal viruses. They repair their defenses by rapid multiplication and by quickly dying in the proper places and, chemically, in the right way. Evidently life for the epidermal cells must, at times, be extraordinarily difficult, particularly in the most exposed areas. A hardy race of cells like this would be expected to practice every means of survival, and they probably do. Whether hyperplasia is a survival effort is not known, but epidermis and its derivatives are especially inclined to exhibit local hyperplasias. It is not clear to what extent the hyperplasia results from an increase in production of cells on the one hand, or from a more tenacious clinging to life and a resultant decrease in death rate on the other. Spencer (1) has described the malignant transformation of cells as a survival mechanism. The stage is probably set for the appearance of epidermal cancer more frequently than is sometimes realized. So-called precancerous epidermal lesions are removed, or destroyed, by the thousand, and actual cancers are often so successfully treated that many of them are not recorded in mortality statistics. Perhaps, therefore, epidermal cells are more subject than any other cells to the cancerous change.

And lastly, epidermis displays a truly remarkable quality of endurance. It withstands almost all sorts of injurious influences, which act on it mainly by day; it builds up its defenses chiefly by night, at which time the rate of production of new cells by mitosis is almost doubled. Discovery of this nocturnal increase in mitotic activity of epidermal cells was one of the first advances made by members of our team (Cooper and Schiff, 2, 3). Radiologists freely admit the likelihood that dividing cells are more vulnerable to x-ray and radium than nondividing ones; but radi-

ologists are not found staying up late at night on the chance of being able to treat epidermal lesions more effectively. Undoubtedly there is more or less continuous replacement, not merely of whole epidermal cells but also of the components of which they are built. Now that a wide range of radioactive isotopes is available for use as tracers, the rate of replacement of many cellular components marked by the isotopes can be determined. It may therefore be expected that light will be shed on the mechanism of the endurance of the epidermis.

It will be helpful to contrast accelerated and retarded aging of the skin. There are people whose skin looks somewhat older than would be expected when their age is admitted. More rarely, examples are seen of pronounced acceleration of the processes of aging. In this connection, there are two diseases of particular interest, in which the usual attribute of persistence of youthfulness of the skin breaks down. In the first, termed Simmonds' disease, or progeria, and caused probably by pituitary insufficiency, the individual, though young in years, is dreadfully old in fact. Senility is manifest in the skin and in many other organs. In the second disease, known as xeroderma pigmentosum since the skin is dry and pigmented, the lesions of senile keratosis appear while the individual is still a child, and are invariably followed by multiple epidermal cancers and early death. Of all the tissues, only the skin is prematurely aged, and it is abnormally sensitive to light, which acts as a carcinogen.

Fortunately, attention is more attracted by numerous examples of long service and apparent immunity of the skin to the forces of aging. Weidman (4) speaks of the thin skin on the trunk of the man of 85, which still affords protection as it did when the man was 20. The life span of this epidermal cloak is a subject of conjecture. Dublin (5) states that the life span properly conceived, is the limit beyond which human life does not extend even under the most favorable circumstances. Since life beyond 100 years is extremely rare, Dublin calls 100 years the life span. Friedenwald (6) gives the possible life span of the eye at 120 to 130 years. In length of life span, epidermis may head the list. In all probability this is because of the endurance qualities of the basal cells. These vegetative cells are by nature intermitotics —that is, their individual life span extends from the mitosis which gives them birth to the succeeding mitosis, when each gives rise to two new individuals (7). For them, life is not terminated by senility and death. They remain young throughout life, and this layer of vegetative intermitotics, repeatedly replacing itself and pushing up other cells to replace those less favorably placed, retains all the attributes of youth for many years.

Some details concerning this reservoir of cell power are worthy of mention. Though the reservoir is thinly spread, it is of quite a depth when considered in terms of the several levels of units as small as epidermal cells, for levels, or strata, can be recognized. The intermitotic vegetative basal cells are in touch with the basement membrane. Externally, or, anatomically speaking, distal to these basal cells is a wider layer of larger and more differentiated spinous cells. Many of these spinous cells are capable of mitosis, and those whose individual lives end in mitosis are designated as differentiating intermitotics; for, like the erythroblasts of bone marrow, they are definitely in the line of differentiation displaced from the vegetative intermitotics which constitute the reservoir. Thus in the epidermis these strata are encountered in order: an inner layer of vegetative intermitotics, the basal cells, which represent the "fountain of youth"; next, spinous cells, many of which, while progressively differentiating in each rising generation, still live intermitotic lives; and lastly, postmitotic cells, the lives of which are not terminated by mitosis but end in senility and death.

The fact that we are leading up to is that quite often the percentage frequency of mitosis is higher in the spinous than in the basal cells (8, 9). In other words, the rate of

multiplication is slow in the basal cells, accelerated in the spinous ones, and then ceases in the cells more distally placed. Recent studies have brought to light the significant fact that in approximately the inner half of this exceedingly thin epidermal sheet, the level of maximum cell replacement rises and falls under certain conditions, which we do not here have space to describe (10, 11).

Certainly the manner of life, the replacement, and the protective service in death of the cells in this tough film of epidermal tissue do stir the imagination. There are also practical reasons why the epidermis is a favorable tissue for study. It is on the outside of the body and easily subjected to experimental conditions, many of the consequences of which can be directly seen. Chemical analyses of epidermis relate more directly to the constituent cells themselves than do those of any other tissue. There are no blood vessels, lymphatics, or mesenchymatous elements in the epidermis which must be taken into consideration in the interpretation of results, and tissue fluid is at a minimum. In fact, epidermis is a strictly cellular tissue, and the cells are, we believe, of one kind.

Investigation of age changes is fundamental to the better understanding of any tissue. But the time has passed when this investigation is feasible single-handed. Our study, therefore, is being carried on in four parts, all definitely bearing on the main problem. It is an institutional effort—indeed, an effort in which two institutions are cooperating: Barnard Hospital and Washington University. Thus the whole program is stabilized and given continuity over what is an unusually long life span for a scientific project because it is institutional rather than individual. The personnel changes from time to time. New ideas and techniques come in, but it is expected that the general direction of progress will remain the same insofar as the discovery and integration of quantitative data bearing on the epidermis are concerned.

1. Aging of Human Skin in a Single Protected Area

Evans, Cowdry, and Nielson first concentrated attention on a single region (12). They selected skin of the antecubital fossa as an area but little exposed to trauma and likely for this reason to exhibit age changes more directly and uniformly than elsewhere. Specimens were excised from 7 young (19 to 30 years of age) and 7 old (80 to 94 years of age) volunteers, most of them feeble-minded but otherwise normal, under local anesthesia employing a uniform surgical technique. Before making these biopsies the arms were fully extended, and measured rectangular areas were marked with ink. The lines of excision were several millimeters outside the inked lines. The areas were measured after biopsy and before fixation, after fixation in Bouin's fluid, and after dehydration.

The immediate decrease in area after biopsy, resulting from shrinkage of the dermis, was astonishing in amount. It was noticeably greater in young than in old skin. The total decrease ranged from 38 to 58 per cent in the skin of 3 young subjects. In 2 old subjects there was a decrease of only 12 per cent, while in 1 old individual there was actually an increase of 20 per cent. This fact, that in fixed and stained preparations of skin there is a much greater shrinkage of dermis and resultant folding with apparent decrease in epidermal surface in young than in old people, should be borne in mind.

Measurements of epidermal thickness of the 7 young skins showed a mean of 33.8μ and of the 7 old skins, a mean of 27.3μ. However, because of the lesser shrinkage in old skin, the decrease in thickness, or atrophy, with age may be less than these figures indicate. Epidermis, clearly, can carry on for a long time with few signs of aging.

Biopsies were also made of a middle-aged group. All three groups—young, middle-aged, and old—supplied excellent material for further study, which was interrupted by the war and is now being resumed. Dermis

will be investigated as well as epidermis. Owing to prompt fixation, the measurements of shrinkage, the completeness of clinical histories, and other considerations it is expected that progress can be made in the study of both qualitative and quantitative alterations in elastic and collagenic fibers. Working in Barnard Hospital, another member of the group, R. E. Stowell, has devised and constructed apparatus for the measurement of color in microscopic preparations (13, 14). This equipment is capable of yielding quantitative data concerning specific stains applied to these elastic and collagenic fibers.

This project, involving age changes in antecubital skin, was launched with generous financial assistance from the Josiah Macy, Jr. Foundation.

2. Aging of Human Skin as Modified by Factors Operating Differentially on the Principal Regions of the Body

Another line of work is being supported by the John and Mary Markle Foundation —namely, the investigation of regional age changes in the skin. This investigation is being carried on by E. V. Cowdry, Zola Cooper, and Warren Smith. The objectives are to gather several sets of data on regional differences, to correlate them, and to determine their bearing on age changes.

First, the regional differences in exposure of the epidermis to external influences are apparent. One thinks at once of the face and hands, exposed throughout life to solar radiation, and of other parts of the body which are protected by clothing. The palms of the hands and the soles of the feet are subjected to intermittent pressure-trauma not experienced by skin elsewhere, and there are other regionally operative mechanical and chemical influences. Consider, in this connection, repeated attempts to produce a growth of hair on the scalp and to destroy hair in other areas. Evaporation is great from exposed surfaces and restricted from the axillary and inguinal areas, so that moisture is another differential factor. The epidermis of exposed parts of the body is subjected to a far greater range of environmental temperature—from near freezing to almost cooking by sun exposure enthusiasts—than is epidermis shielded by clothing. In this respect of withstanding temperature changes, epidermis is supreme among tissues, the majority of which can function only within a very restricted range of temperatures. Witness the specific temperature requirements of testicles and bone marrow, demonstrated by Crew (15), Fukui (16), Moore and Quick (17), and by Huggins and his associates (18).

Second, the regional differences in exposure to influences exercised by the body itself are less obvious, but important. These have to do with hair, products of sweat and sebaceous glands, character of dermal backing, vascularity, lymphatic drainage, innervation, and reactivity to hormones. Hormones, for instance, not infrequently act regionally on hair, sebaceous glands, pigmentation, and subcutaneous fatty deposits. An often-dominant factor operating from within and finding regional expression in the skin is heredity. A moment's thought calls to mind so many examples that it is unnecessary to mention any of them.

Third, the regional differences in structure and function are conditioned by heredity and by the already briefly outlined modifying conditions both of external and internal origin. Numerous scattered reports are to be found in the literature on the structural and functional peculiarities of various parts of the skin. They relate to a wide variety of attributes, including distribution of epidermal appendages and the concentration of spreading factors (19), which may mean the difference between life and death following an infection. Often the local differences are only in degree. Therefore data obtained by quantitative measurements are much needed.

And fourth, we intend to discover from

the literature and from our clinical colleagues which lesions of the skin are regionally localized and for each lesion the primary area, the occasionally involved areas, and the areas never involved. Some ex-

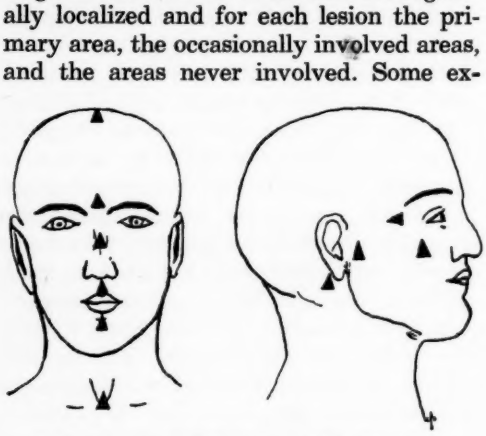

FIG. 1. Areas of Collection of Skin Specimens (Head and Neck).

amples of primary locations are the following:

Vitamin A deficiency—extensor surface of the arms and legs.
Vitamin B (riboflavine) deficiency—sides of nose, oral angles, canthi.
Hyperhidrosis—palms and soles.
Acrochordon (cutaneous tags)—neck, axilla, upper parts of the thorax.
Amyloidosis cutis—anterolateral surface of the legs.
Senile angioma—anterior chest and abdomen.
Neurodermatitis—antecubital and popliteal areas and sides of neck.
Erythema multiforme and icthyosis—extensor surface of the arm and forearm.
Acanthosis nigricans—mouth, axilla, groin, navel.
Psoriasis—scalp, elbows, knees.
Acne—face.

This attempt to put two and two together, so to speak, and to find the why and wherefore in the genesis not only of senile but also of diseased conditions of the skin is an ambitious program. Others have tried often enough before and have established numerous correlations. Our only excuse for tackling the problem is our belief that we can attack it more consistently and on a larger scale, and can bring in newer and better techniques than others have heretofore done.

The discovery which chiefly gave impetus to our investigations was that of a method which permits the complete and clean separation of epidermis from dermis in a condition suitable for chemical analysis (20). Indeed, the results of all chemical analyses of epidermis made heretofore are in question because of incomplete separation. In some cases, only part of the epidermis was cut off or otherwise removed from the dermis for study, while in others, the cut was made so deeply that parts of the underlying dermis were included in the tissue analyzed. However, to get suitable samples of human skin is by no means a simple matter. The removal of skin at

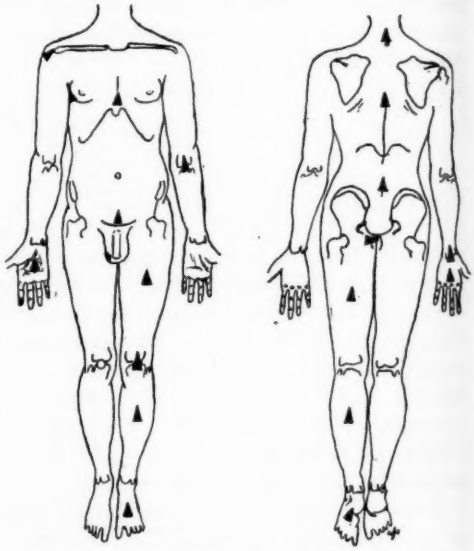

FIG. 2. Areas of Collection of Skin Specimens (Trunk, Abdomen, and Extremities).

autopsy must not deface the body. Consequently, the investigation is limited to pieces of skin taken from selected sites along the routine incisions. At present, through the courtesy of the department of pathology of Washington University, we are studying skin removed from five sites at twenty-four autopsies on individuals of both sexes, ranging in age from stillborn to 80 years of age.

A slower but far more effective way to collect specimens is to freeze selected, carefully wrapped bodies and hold them for thirty days in the morgue, after which time the bodies become available for scientific purposes. Preliminary tests having shown that the skin of these bodies remains in remarkably good condition, we excise samples from the thirty-one selected regions indicated in figures 1 and 2. The samples are cut in the shape of isosceles triangles, with the most acute angle forward. The reason for so doing is to enable us properly to orient the final preparations. Thus far, a good beginning can be reported in the examination of specimens from 5 males, aged new born, 29, 68, 77 and 80 years respectively. In addition to the usual techniques that involve the cutting and staining of sections, we have used a method not hitherto employed for such regional studies. The skin samples are immersed in 1 per cent acetic acid for twenty-four hours. This simple device loosens the attachment of epidermis to dermis so that the former can easily be stripped off as a complete sheet of tissue. The separated epidermis is then stained with hematoxylin, cleared, and mounted with the inner surface uppermost.

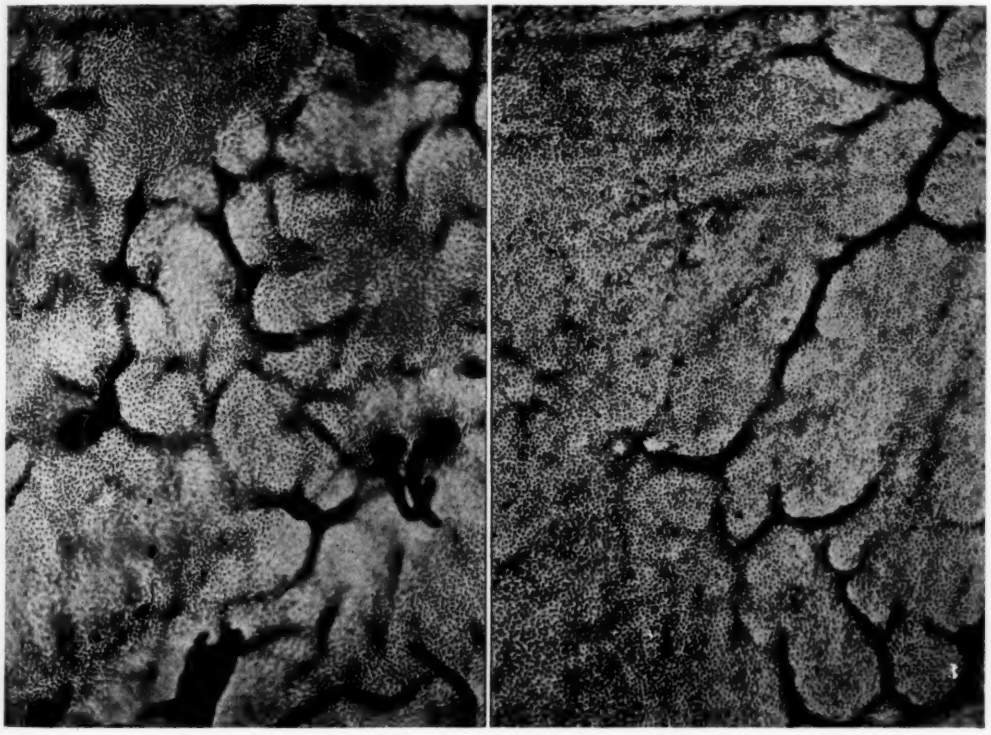

FIG. 3. Neck, Anterior (Suprasternal Notch).
Newborn, Full Term 80 Year Old Man

In the microscopic examination of these preparations of whole epidermis from above, the investigator is in the position of an individual looking at his epidermal coat from within and at a high magnification. Observing thus the whole epidermis from within, the ducts of sweat glands, hair

follicles, and many sebaceous glands are first seen. A more distant focussing shows the epidermal sheet itself. Its architecture is in large measure distinctive for the principal regions of the body.

Figures 3–6 illustrate a few of the many regional differences between the epidermal investment of a new born infant (on the left side of each figure) and that of an 80 year old man (on the right). The specimens from the young infant have, in general, a smoother, clearer appearance. Epidermal ridges are partly formed in the skin of the neck (fig. 3), but they are still rudimentary in that of the forehead (fig. 5) and in that of the temple (fig. 6) of the infant. In these two latter locations, the rete network can be discerned faintly outlined near the openings of the hair follicles. The ridges are, however, clearly and unmistakably seen in the corresponding regions of the 80 year old man except where they have been suppressed by atrophy. Note that these epidermal thickenings are more or less continuous ridges, not "pegs." The designation "epidermal pegs" or "rete pegs" is misleading. It is the natural consequence of the examination of skin only in vertical sections.

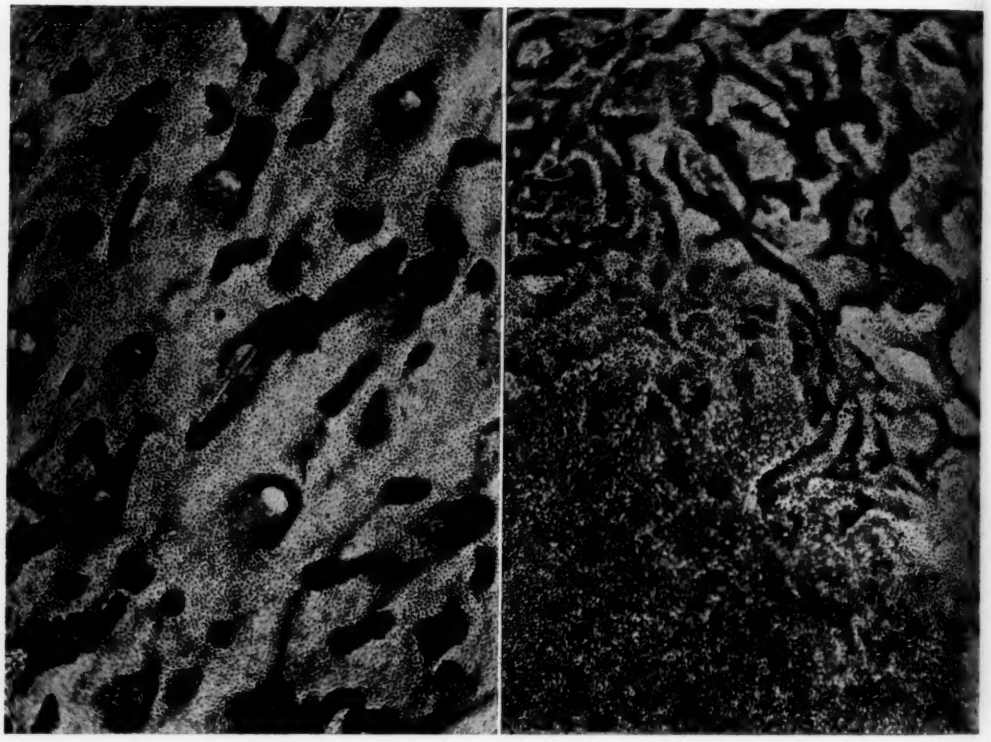

FIG. 4. Bridge of Nose.

Newborn, Full Term 80 Year Old Man

Figure 3 shows several deeply stained, wormlike structures with free ends sticking up toward the observer (that is, actually down into the dermis) and with attached ends terminating in funnel-like swellings of epidermis. These are the ducts of sweat

glands, the coil-like bodies of which remained in the dermis when the epidermal sheet was lifted off. None of these ducts is present in the corresponding photographed area of old epidermis. Many more sweat glands per unit area in young skin than in old skin is a characteristic of all the thirty-one regions studied.

early beginning of rete network formation around the openings of the hair follicles, the ridges enclosing noticeably smaller areas than in the adult. As in all the other regions depicted, there are many hair follicles and sweat gland ducts. The outlines of the hair follicles do not appear clearcut because the microscope was focussed not

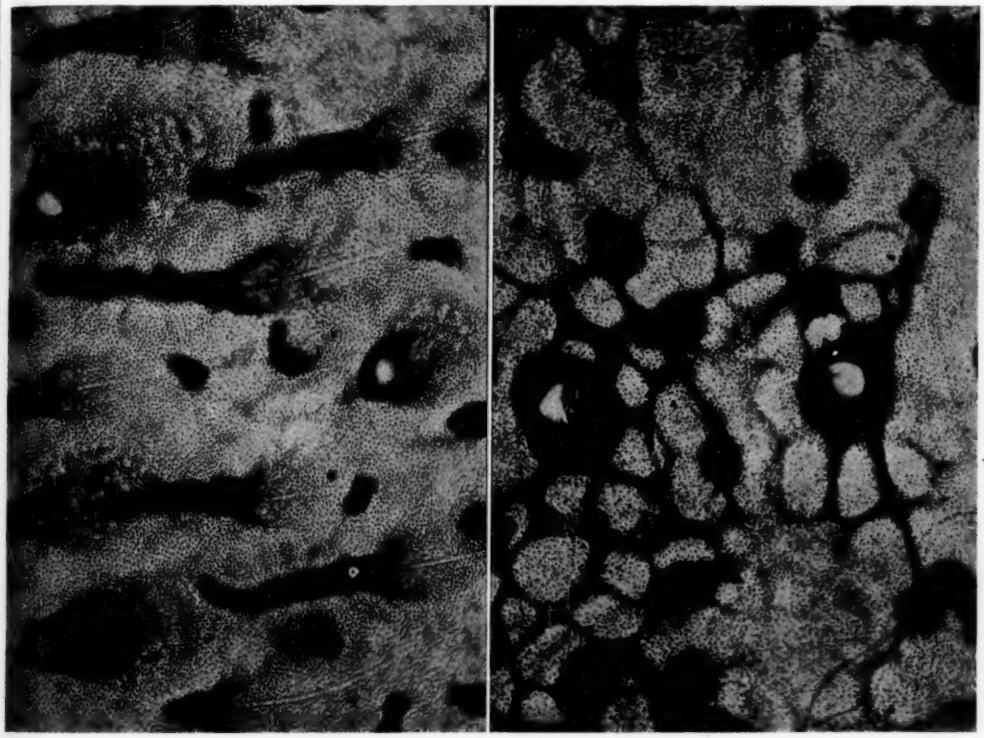

FIG. 5. Forehead.

Newborn, Full Term 80 Year Old Man

Figure 4, showing epidermis from the bridge of the nose, reveals in the infant still more numerous ducts of sweat glands and several hair follicles (one in almost the exact center of the photomicrograph), whereas neither of these epidermal appendages is seen in the section from the 80 year old man.

Figure 5 illustrates, in the newborn, the on them but beyond them on the epidermis itself in order to demonstrate the rete network and basal layers. However, the points of attachment to these follicles of sebaceous glands are indicated by knobs. The most distal knobs are, in this figure, situated at an appreciable distance from the openings of the follicles. In contrast, the corresponding photomicrograph of the 80 year old

man presents well developed ridges, except in small areas of atrophy, fewer sweat glands, and only two hair follicles.

Figure 6 also supplies an interesting contrast. The young and old epidermises are here from the region of the temple. In the newborn infant, hair follicles with some lateral swellings, a bare suggestion of ridge formation at the bases, and numerous ducts of sweat glands are seen. In the old specimen, there is extensive loss of ridge formation and atrophy as well as sharply defined hyperplasia of closely crowded ridges in net formation below and to the right.

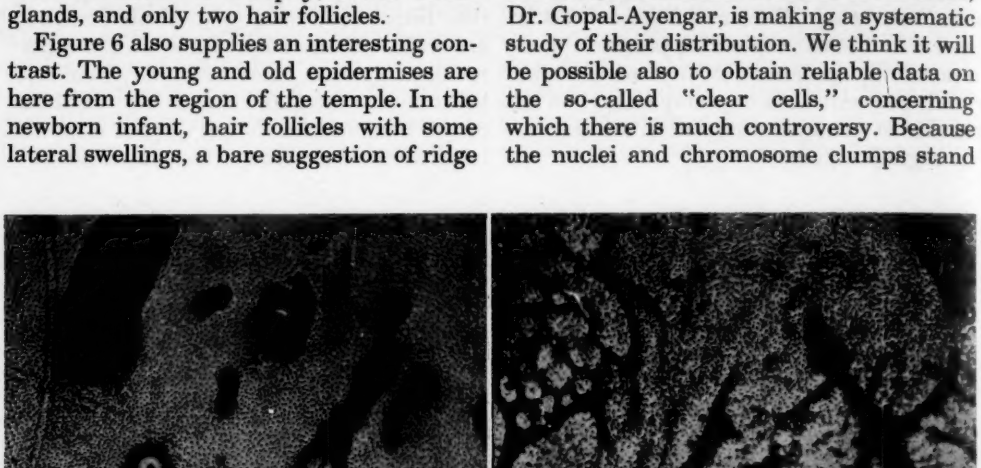

FIG. 6. Temple.

Newborn, Full Term 80 Year Old Man

It was in epidermal whole mounts that Cooper and Schiff discovered the mitotic rhythm already alluded to. Binucleated epidermal cells are of fairly common occurrence, and another member of the team, Dr. Gopal-Ayengar, is making a systematic study of their distribution. We think it will be possible also to obtain reliable data on the so-called "clear cells," concerning which there is much controversy. Because the nuclei and chromosome clumps stand out so sharply, areas of epidermis containing atypically shaped nuclei and an abundance, or a lack, of mitoses can readily be identified. As Cooper has discovered, the multiple origin of tiny basal cell carcinomata can be observed far more clearly than in sections. Epidermal features are displayed with the clearness of a topographic map; viewed with the binocular microscope,

a wonderfully clear view is obtained of epidermal valleys and ridges, of foci of hyperplasia and of atrophy, and of areas of pigmentation and depigmentation.

Other techniques, in addition to the making of whole mounts, will be employed. Just now the several regions are being examined in sections routinely stained with hematoxylin and eosin with the object of ascertaining how far the dermis has been modified by the treatment the bodies received before specimens were excised.

3. Influence of Age on Response of Mouse Skin to Carcinogen

The investigation of age changes in a single area of human skin, supplemented by integration of the factors which operate differentially on aging of the skin in different regions of the human body, is vitalized in our program by functional analyses of active responses by the skin at different ages —that is, by a systematic study of the capabilities of the skin. This study must of necessity be done in experiments on animals, so that these researches on aging become a part of the major project of Barnard Hospital, which is to integrate the changes that occur in epidermis of mice as cancer develops in response to treatment with methylcholanthrene. Results in the major project have recently been summarized (21).

Cowdry and Suntzeff (22) have tested the response of epidermis of young and old mice of the New Buffalo strain to equal treatment with methylcholanthrene. It should be noted in passing that the epidermal sheet in mice is normally an even thinner expanse of tissue than in human beings. In the region studied, it consists of only two, sometimes of three, layers of cells. There are no sweat glands. We have observed that epidermal cancers appear more quickly and in higher percentage in young than in old mice. In other words, we have found that young epidermis is distinctly more susceptible than old epidermis to the carcinogen. However, with young and old mice of CBA strain the results were different. The young were not much more susceptible than the old ones, but were about the same. Difference in hereditary endowment of the two strains loomed up as the reason. Epidermis is a leader among tissues in the display of hereditary traits, as is well known.

We then secured the cooperation of our chemist, Dr. C. C. Carruthers, and strove to discover the mechanism whereby differing hereditary endowments operate in molding the response of epidermis to a carcinogen. We thought that the two strains of mice might inherit epidermises of different chemical composition, which difference would condition the response. The calcium (23) and lipid (24) contents of epidermis were chosen for investigation because previous experiments at Barnard Hospital had shown great decreases in both of these components in methylcholanthrene carcinogenesis.

As was anticipated, the old New Buffalo mice had a higher concentration of epidermal calcium than young ones—0.054 mg. per 100 mg. of epidermis, as compared with 0.043 mg. It looked as if the increase in calcium with advancing age might condition the decrease in carcinogenic response. But we found about the same increase in calcium in old CBA mice—0.055 mg. compared with 0.040 mg. in the young mice. As already indicated, this was not correlated with a decrease in carcinogenic response. Old animals of the two strains with similar epidermal calcium content responded about equally, whereas young New Buffalo mice responded to a much greater degree than young CBA mice, though both had practically the same epidermal calcium content. Neither was the amount of lipid in the epidermis correlated with the degree of cancer production. These studies on the influence of age on carcinogenesis have been supported by grants from the International Cancer Research Foundation.

The line of advance now being followed involves the sebaceous glands of mice of

different ages in relation to response to the same carcinogen. This study was initiated in view of the discovery by Simpson and Cramer (25) that the sebaceous glands play an important role in the mechanism of entry of the carcinogen into the skin.

4. Influence of Age on Epidermal Carcinogenesis in Man

Epidermal cancers are much more numerous in old than in young people. There is, however, a general belief that after a given type of cancer starts it usually progresses more slowly in old than in young individuals. Since, as related, we are in our major project investigating the genesis of epidermal cancer in mice, it is convenient to avail ourselves, in the examination of comparable human tissues, of the techniques which have proved useful for mice. These extensions from mice to man have as yet been effected in only a few instances.

The first extension was to compare the displacement of epidermal nuclear chromatin and nucleoli under ultracentrifugal force in different human tissues (26). This displacement was seen to be least in normal epidermis, greater in the hyperplastic epidermis of a healing wound, and greatest in squamous cell carcinomata: exactly the sequence of events seen in normal mouse epidermis, in epidermis rendered hyperplastic with methylcholanthrene, and in the resulting squamous cell carcinomata. The pronounced decrease in displacement with increasing age in mice, passing from embryonic through newborn to adult mouse epidermis, has still to be checked in human tissues.

The second extension from mice to man was to measure the thymonucleic acid content in human tissues. Stowell and Cooper (27) observed that hyperplastic epidermis, in which the cells are large, contained less thymonucleic acid per unit volume than normal epidermis; further, that the carcinomata contained more thymonucleic acid per unit volume than normal epidermis. The sequence in these human tissues from normality through hyperplasia to malignancy is by no means so clear as in our carcinogenic series of mice, but the changes in concentration of thymonucleic acid are similar, which is the point stressed.

The third extension, by Suntzeff and Carruthers (28, 29), was to analyze apparently normal human epidermis and human squamous cell carcinomata. In specimens of epidermis from eighteen persons ranging in age from 15 to 79 years they found no difference in the amounts of potassium, sodium, magnesium, and calcium. Analyses of a more extensive series are required before it can be said that in this large fraction of the life span the concentrations of these elements in the human epidermis remain substantially constant. The concentrations of calcium and zinc were distinctly lower in human than in mouse epidermis. Somewhat similar decreases in calcium, copper, and zinc were found in squamous cell carcinomata of mice and men.

We hope to construct other bridges for cross-information between observations made in carefully controlled experiments on mice and in somewhat opportunistic studies on man. High on our priority list is a chemical study of senile keratotic lesions.

Summary

The program includes four closely related lines of research: 1. Attention is concentrated on the detailed study of specimens of antecubital skin removed at biopsy from volunteers. This protected area was selected in the expectation that age changes would occur in it with greater uniformity than in areas more exposed to the action of complicating factors. 2. Aging of the skin is under investigation in thirty-one carefully chosen regions of the body, and efforts are being made to clarify the influence of factors of external and internal origin operating differentially on the regions. 3. The influence of age on epidermal carcinogenesis in mice is being studied. 4. Observations are being made on human tissues, as nearly parallel as possible with those made on mice.

In all these lines of research, the empha-

sis is on quantitative measurements and on the constructive integration of data obtained thereby. Cohesion leading to unification is but natural because all the work deals primarily with one and the same tissue—epidermis. This extremely thin coating of the body is of great biologic interest. It is an avascular sheet of cells, closely knit together, alive internally and dead externally, in which the stage appears to be set for cancer development more frequently than anywhere else in the body. However, no tissue exists for and by itself. All are mutually dependent. Consequently, there is frequent occasion to extend observations to the dermis and even further afield.

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Pathologic Changes of Old Age

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OBSERVATIONS MADE ON AUTOPSIES PERFORMED ON ELDERLY PSYCHOTIC PATIENTS HAVE, FOR THE MOST PART, BEEN CONFINED TO THE PATHOLOGIC CHANGES OF THE NERVOUS SYSTEM. DRS. STRASSMANN AND KRUSH HERE PRESENT THE GENERAL PATHOLOGIC CHANGES IN FIFTY PSYCHOTIC PATIENTS RANGING IN AGE FROM 80 TO 94 YEARS. THE PSYCHIATRIC DIAGNOSIS IN MOST CASES WAS EITHER PSYCHOSIS WITH CEREBRAL ARTERIOSCLEROSIS OR SENILE DEMENTIA. NO COMPARISON IS INTENDED BETWEEN THESE OBSERVATIONS AND THE RESULTS OBTAINED FROM AUTOPSIES ON ELDERLY PATIENTS WITHOUT MENTAL SYMPTOMS PRIOR TO DEATH. THUS SOME BUT NOT ALL OF THE STATEMENTS MADE BY OTHER OBSERVERS ABOUT PATHOLOGIC CHANGES OF OLD AGE IN GENERAL ARE CONFIRMED BY THE REPORT OF DRS. STRASSMANN AND KRUSH.

MENTALLY ill patients of advanced age today form a large proportion of the inmates of mental institutions. While the clinical and neuropathologic picture of elderly psychotic patients treated for a senile or arteriosclerotic psychosis has been described frequently (1, 2, 3, 4, 16), the discussion has been confined essentially to the psychiatric diagnosis and to the pathologic changes of the nervous system. Only occasionally have the general pathologic changes been mentioned, and then, briefly (3, 26). For this reason the observations from 50 complete autopsies performed by us on patients ranging in age from 80 to 94 years are herein presented, the purpose being to report the general pathologic changes including those of the brain, in patients with disease of the nervous system. No comparison is intended with results obtained from necropsies of patients in the same age group without mental symptoms prior to death.

MATERIAL

Thirty women and 20 men comprised this group of patients. The clinically established diagnoses were: psychosis with cerebral arteriosclerosis—25, senile dementia—20, dementia praecox, paranoid type—3, paranoid condition—1, and alcoholic psychosis with deterioration—1. The proximate cause of death was tabulated as follows: massive pulmonary embolism following a femoral thrombosis—7, coronary sclerosis and occlusion—4, purulent bronchitis and bronchopneumonia—33, cachexia due to carcinoma—4, and emaciation associated with widespread caseous tuberculosis—2. The respiratory infection was associated with generalized arteriosclerosis and in 9 instances, with hypertensive heart disease and a large cerebral hemorrhage or thrombosis.

The 50 patients were divided into two groups according to their general condition at the time of the autopsy. Group I comprised 30 poorly nourished or emaciated patients (12 men and 18 women). Group II consisted of 20 well nourished or obese patients (8 men and 12 women).

AUTOPSY OBSERVATIONS

General Description.—Decubital ulcers were equally frequent in both groups and were present in about 50 per cent of all patients. These ulcers were most frequently situated in the sacrococcygeal region, on the buttocks over the ischial tuberosities, and on the thighs near the greater trochanters, but were seen also in other parts of the body, such as the heels, the ankles, the iliac crests, and the shoulder blades. They varied in depth from superficial defects of the skin to deeply infected areas which exposed musculature or even bones. Subcutaneous hemorrhages over the outer side of forearms, wrists, and hands were more common in Group I (13 cases) than in Group II (7

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cases). All patients were edentulous. Arcus senilis corneae was frequently observed.

Respiratory Organs.—Calcification of ribs, fibrous adhesions between lungs and chest wall, enlarged anthracotic lymph nodes, emphysema, bronchitis, and bronchopneumonia were frequent in both groups. Terminal bronchopneumonia was usually caused by a mixed infection with predominance of pneumococci. No example of lobar pneumonia was observed. The average weight of the lungs was as a rule greater than normal because of inflammation and congestion. A maximum weight of the right lung of 1,430 gm. was found in one patient and of 900 gm. for the left lung in another. Fourteen patients without acute or chronic inflammation showed a low weight of each lung. In these cases the weight of the right lung varied from 250 to 350 gm. and that of the left lung, from 230 to 300 gm. The microscopic picture of the pneumonic process was that of a typical bronchopneumonia. Smaller bronchi, bronchioles, and alveoli were filled with polynuclear leukocytes, red cells, edema fluid, fibrin, and histiocytes. The histiocytes were filled with fat or blood pigment. A chronic pneumonitis, anthracosis, and emphysema were frequently seen besides the acute inflammation.

Cardiovascular System.—An atheromatosis of the lower abdominal aorta, sclerosis of the mitral and aortic valves and coronary and cerebral arteries, and arteriosclerotic changes of the kidneys were common in both groups. All patients exhibited generalized arteriosclerosis, although the degree and extent of these changes varied. From the abdominal aorta the calcifications and atheromatous plaques extended over the bifurcation into the iliac and femoral arteries. In more advanced cases, calcific plaques and ulcers with adherent thrombi were present throughout the entire aorta, which was ectatic. A true saccular aneurysm of the abdominal aorta filled with a thrombus was seen in 2 obese women. Small calcific nodules above the aortic cusps in the sinuses of Valsalva were fairly frequent. The mitral and aortic valves were generally thickened. In 50 per cent of the patients (14 patients of Group I, 12 of Group II), the aortic valves were calcified. In 32 per cent (8 patients of Group I, 8 of Group II), the mitral valves were calcified. In some instances the ostia were stenotic. The walls of the coronary arteries were calcified and their lumens narrowed in 76 per cent (21 patients of Group I, 17 of Group II). In 4 obese patients (2 men and 2 women), coronary occlusion by a thrombus had caused sudden death; one of these patients had a senile psychosis. Forty per cent showed a myocardial fibrosis (11 patients of Group I, 9 of Group II, 10 men and 10 women). In the obese group, an increase of epicardial fat and an infiltration of the myocardium by fat tissue was frequent. Lipofuscin in the myocardium was abundant in both groups. In 5 patients a

terminal verrucous endocarditis was superimposed on the sclerotic process of the aortic or mitral valves. The weight of the heart was smaller in the poorly nourished than in the obese group. The average weight was 313 gm. in the former and 392 gm. in the latter. No true atrophy was observed. A decided difference in the heart weight of men and women was noted in Group I. In this group, the average weight of the heart was 280 gm. in the women and 360 gm. in the men. Hypertrophic hearts were observed in all types of psychoses. An 80 year old woman with a senile psychosis had a heart weighing 610 gm.; an 84 year old man with a schizophrenia of long duration had a heart weighing 600 gm.; an 87 year old man with an arteriosclerotic psychosis had a heart weighing 620 gm. Corresponding to the increase in the heart weight, the wall of the left ventricle was hypertrophic, usually measuring from 18.5 to 20 mm. and in a few instances, 25 to 30 mm. The right ventricle measured from 5.5 to 6 mm. and was frequently slightly hypertrophic. A high blood pressure during life of 200/100 was frequent in arteriosclerotic and senile patients, but a blood pressure of 140/80 was nearly as frequent. Thrombi in the femoral and popliteal veins were found in 20 per cent of the patients. Sudden death by pulmonary embolism occurred in 7 of these patients, in 2 of them after a recent fracture of the hip.

Spleen.—The essential observations were atrophy of pulp and lymph follicles, sclerotic changes of the splenic artery and arterioles, and an increase of fibrous tissue (fibrosis). The main splenic artery was thickened, hard, tortuous, and calcified, and occasionally small aneurysms were observed. The capsule was often thickened, and small calcific nodules were seen sometimes in the hilar region. The atrophy was more evident in the poorly nourished than in the obese group. The average weight of the spleen was 87 gm. in the former and 130 gm. in the latter group. Small spleens with a weight ranging from 40 to 60 gm. were occasionally encountered in Group I. In this group, the maximum weight of a spleen was 150 gm. and in the second group, 210 gm. An 84 year old patient with schizophrenia, who had a hypertensive heart weighing 600 gm. had a spleen weighing 60 gm.

The microscopic changes were: passive congestion, fibrous thickening of the capsule, increase in number and thickness of trabeculae, thickening and hyalination of the walls of the arterioles with consequent narrowing or occlusion of the lumens, and numerous histiocytes containing hemosiderin.

Adrenals.—A postmortem softening of the reticular zone was common even when the necropsy was performed shortly after death. In a few cases the adrenals were small, but no gross anomaly was seen in the remainder. Microscopic examination revealed a thickened capsule with connective tissue fibers infiltrating the cortex, sclerosis and thickening of the arterioles, atrophy of the zona glomerulosa, and round cell accumulations in the cortex and medulla. Occasionally the lipoid of the cortical cells was diminished, but in most instances the cells were filled with lipoid material. In some cases small cortical nodules consisting of lipoid-filled cells were visible. Much lipofuscin was present in the reticular cells.

Pancreas.—The pancreas was usually small in the poorly nourished group. There was frequently a replacement of parenchyma by fat tissue in the obese group (lipomatosis of the pancreas). Microscopically, in both groups there was a fat infiltration associated with increased connective tissue, sclerosis and hyalination of arterioles, and round cell accumulations. Fine fat droplets were seen in the islet and acinic cells and in the interstitial tissue; the lumens of the pancreatic ducts were distended in some instances.

Liver.—There was pronounced atrophy of the parenchyma of the liver in the poorly nourished group, less conspicuous atrophy in the obese group. The average weight was 1,013 gm. in Group I and 1,266 gm. in Group

II. The average weight of the liver was 1,095 gm. in women and 1,110 gm. in men. Weights ranging from 700 to 900 gm. were not uncommon in the first group but were rare in the second. The largest liver, weighing 1,800 gm., was seen in an 80 year old woman with senile dementia and hypertension. The capsule of the liver was frequently thickened (perihepatitis). The liver was firm, sometimes slightly uneven, and usually of mottled appearance. Gallstones and chronic cholecystitis were found in 28 per cent of the patients (11 women and 3 men). An acute gangrenous cholecystitis with beginning peritonitis was discovered in an 83 year old man with an arteriosclerotic psychosis.

On microscopic examination were seen increased fibrous tissue with round cell accumulations, passive congestion, atrophy of cells in the central parts of the lobules, increased lipofuscin, and generally extensive fatty metamorphosis of liver cells.

Urogenital Organs.—The kidneys of both groups consistently revealed atrophy and arteriosclerotic changes. They were small, firm, dark bluish red with frequent cortical cysts and depressed scars. The weight of the kidneys was diminished in both groups. The average weight of the single kidney in Group I was 96.5 gm. and in Group II, 105 gm. In the second group, the kidneys were surrounded by much fat tissue. A minimum weight of 40 gm. for each kidney was observed in a well nourished woman of 93, who had an arteriosclerotic psychosis. A 90 year old man with a senile psychosis had a horseshoe kidney with hydronephrosis. In a number of instances the weight of the right and of the left kidney differed greatly, one kidney being more atrophic and scarred than the other. A weight of 150 gm. for each kidney was observed in some of the obese patients who had hypertension and chronic passive congestion.

The microscopic changes were uniform. The renal arteries and their branches showed a fibroblastic thickening of the walls with narrowing or occlusion of the lumens. Some of the arterioles were involved in this process, but as a rule the afferent and efferent arterioles of the glomeruli were intact. Besides hyaline glomeruli, normal glomeruli were seen. The cortical cysts contained a homogenous material and were lined by cuboidal epithelium. The cortical scars were wedge-shaped and consisted of fibrous connective tissue with hyaline glomeruli, round cell accumulations, thickened arteries, and tubules with albuminous casts. Passive congestion and cloudy swelling of tubular cells, which contained fine fat droplets, were frequent. Occasionally, a leukocytic infiltration of peripelvic and renal tissue was seen (pyelonephritis).

In several male patients, trabeculation, small diverticula, and hemorrhagic inflammation of the bladder were observed. The prostate showed a benign nodular hypertrophy of the lateral and/or middle lobes to a varying degree.

Microscopically, the glandular tissue of the prostate showed cystic dilatation, proliferation, and many corpora amylacea. The fibrous tissue was increased and showed round cell accumulations. An adenocarcinoma of the prostate with metastases to the lymph nodes was seen in an 83 year old patient with arteriosclerotic psychosis.

In the female patients, the ovaries were small and atrophic. In 4 instances, the ovaries were replaced by fibrotic masses containing multiple cysts. In 8 women, intramural and subserosal fibroids of the uterus were found. A few of these fibroids were large and calcified. Two uterine polyps were encountered, giving microscopically the picture of a cystic fibroadenoma. One cervical carcinoma was seen in a 93 year old woman. In 7 patients, diffuse endo- and myometrial hemorrhages were seen. Microscopically, the uterus showed distended mucosal glands and sclerotic hyalinized arteries, some of which were calcified. The lumens were narrowed or obstructed.

Gastrointestinal Tract.—Mucosal hemorrhages of stomach and duodenum were

frequent. Acute hemorrhagic ulcerations of the upper gastrointestinal tract were seen in 8 patients. The ulcers were multiple, varying considerably in size and shape. They were situated in the lower esophagus in 3 cases, in the fundus of the stomach in 2 cases, and in the upper duodenum in 3 cases. Advanced gastromalacia with necrosis of mucosa and submucosa was seen in 10 patients. Atrophic gastritis was usually present. One healed peptic ulcer, 1 polyposis of the stomach, and 2 carcinomas of the stomach were observed. One of the latter was an adenoacanthoma with squamous cell metaplasia of the mucosa (6). In 6 patients an acute enteritis, and in 11, diverticula of the sigmoid colon were noted.

Microscopic examination of the ulcerated areas showed necrosis, cellular infiltration, hemorrhages, and edema of mucosa and submucosa, thrombi in the veins, and thickening of the arteriolar walls.

Pituitary.—The pituitary was small and soft in some cases, but usually no gross anomaly was observed. The anterior part showed increased fibrous tissue which extended from the thick fibrous layer at the border of the posterior part into the anterior pituitary. Small cysts filled with homogenous material and larger colloid-filled cysts were present. All three groups of cells were seen. In some instances the basophilic cells were increased in numbers, contained vacuoles, and infiltrated the posterior part. Fine lipoid granules were observed in all the cells, especially in the eosinophilic cells and in the interstitial tissue. The walls of the arterioles were thickened. Occasionally, corpora amylacea with iron were seen. The pituitary of an 87 year old woman with arteriosclerotic psychosis showed many cystic cavities with laminated masses which gave an iron reaction.

Cranial Cavity, Meninges, and Brain.—Seven female patients showed numerous internal exostoses of the frontal bones. The dura was adherent to the skuli, and the leptomeninges were thickened and grayish white in most cases. External and internal hydrocephalus was common. Small subdural hemorrhages, old and recent, were seen in 6 patients. In one case, the hemorrhage was caused by a fracture of the skull and associated with lacerations of the brain. The cortex showed circumscribed or diffuse atrophic areas to a varying degree. The frontal convolutions were often small. Occasionally large cortical defects were seen. A few small brains were observed. An 87 year old woman with an arteriosclerotic psychosis had a brain weighing 840 gm.; a 93 year old man with a similar psychosis had a brain of 950 gm.; an 82 year old woman with a senile dementia had a brain of 980 gm. The average weight of the brain in Group I was 1,183 gm., in Group II, 1,160 gm.; in the men, 1,229 gm., in the women, 1,140 gm. A maximum weight of 1,500 gm. was obtained in an 82 year old man with an arteriosclerotic psychosis.

The arteries at the base of the brain were sclerotic, thickened, tortuous, and calcified in all patients, although the degree of sclerosis varied. Frequently similar changes were seen in the middle and smaller branches of these arteries. In a few instances the right and left vertebral artery were of different size and in a different way affected by the sclerosis. Three large spontaneous hemorrhages which had ruptured into the ventricles and the subarachnoid space were seen in the region of the basal ganglia. In 2 of these cases the diagnosis had been senile psychosis. Gross softenings with or without hemorrhages were seen in 34 patients (20 in Group I, 14 in Group II; 20 females and 14 males). The softenings formed brown depressed areas or cysts. They were situated in the striatum and globus pallidus in 21 cases, in the cortical and subcortical layer in 8 cases, and in the cerebellum in 5. The choroid plexus had often a cystic, edematous appearance.

The microscopic changes consisted of arteriosclerotic and degenerative processes. Most conspicuous was the presence, in 33 patients, of numerous argentophilic plaques in the gray matter of the cortex. The size and structure of the plaques varied. Many

of them had a black center with a lighter halo surrounded by black strands and fibrils. Many neurofibrils showed signs of Alzheimer's disease, such as thickening and corkscrew or small basket forms. Some of the plaques were situated near or around blood vessels; the walls of the arteries showed a strong affinity for the silver stain. In several cases argentophilic plaques were found in the subcortical white matter, the basal ganglia, especially striatum, and in the cerebellum. The color of the plaques varied from pale gray to black. In 17 patients no argentophilic plaques, or only a few scattered ones, could be discovered. In 6 of these cases the clinical diagnosis had been senile psychosis. An admixture of numerous senile plaques with softenings and hemorrhages of the brain was observed in 24 patients. Lipofuscin and lipoid granules were found in many nerve and glial cells and in the walls of the arteries and arterioles of different parts of the brain (cortex, basal ganglia, dentate nucleus). The cortex showed a marginal gliosis, acellular areas, swelling or shrinkage of nerve cells, satellitosis, and neuronophagia. Other parts of the brain, such as the basal ganglia and the dentate nucleus, showed similar cell changes. Increased iron deposits around or in the walls of capillaries and arteries were seen in the globus pallidus and in some cases also in the striatum, the substantia nigra, the dentate nucleus, and the granular layer of the cerebellum. Occasionally, iron was noted in the nerve cells of these areas. It was always present in the amyloid bodies of the choroid plexus and in the pineal gland, in some instances together with calcium deposits.

All cerebral arteries and arterioles showed a fibroblastic thickening and often a hyalination of the walls and a narrowing or occlusion of the lumens. The perivascular spaces were distended and surrounded by perivascular gliotic tissue. Small cavities were frequent in the basal ganglia (état criblé). Large and small ischemic softenings were found in 68 per cent of the patients. They formed cavities filled with destroyed nerve tissue, gliotic fibrils, new-formed capillaries, and numerous histiocytes. The histiocytes contained fat, hemosiderin, or hematoidin. Secondary hemorrhages in the softened areas were common. The surrounding brain tissue showed gliosis and swollen astrocytes and histiocytes, some of the latter invading the blood vessels. Nerve cells and nerve fibers had more or less disappeared from these areas. In many instances, round cell accumulations around the sclerotic arteries or distended veins were seen.

Comment

The pathologic changes of old age were described in detail by Aschoff in 1938 (11). His report was based on 400 autopsies performed on patients over 64 years old. The material used in our study was different. Only necropsies performed on mentally ill patients, 80 to 94 years of age, were considered. For this reason, some but not all of the statements made by Aschoff and based on his more general material were confirmed.

Though 60 per cent of the patients showed a definite emaciation, in only 12 per cent was this cachexia attributable to chronic wasting disease, such as carcinoma or tuberculosis. In the remainder, the most important causes of emaciation were believed to be the patients' reluctance to eat because of their mental disturbances, decreased metabolism due to age, and the frequent presence of atrophic gastritis. The patients showed arterio- and arteriolosclerotic processes varying in degree, in all organs. The blood supply and the oxygenation of the tissues was often impaired. Because of this fact, necrosis and atrophy of the parenchyma of the organs and replacement by fibrous or gliotic scars were frequent. Most significant was the atrophy of spleen, liver, kidneys, female reproductive organs, and brain. In addition to the arteriosclerosis, the decreased metabolism and general malnutrition played a role in causing the profound atrophy observed in these organs. Atheromatous plaques, calcifications, and ulcers were always seen in the lower abdominal aorta near the bifurca-

tion and extending into the iliac and femoral arteries. This confirms Dock's recent statement regarding the predilection of atheromatosis for these areas in elderly people (12). In advanced cases, the whole aorta was ectatic and showed plaque formations. In two instances this distention had produced saccular aneurysms of the abdominal aorta. Calcifications of the aortic and mitral valves were seen in about 50 per cent, while calcifications of the coronary arteries were observed in 76 per cent of the patients.

Aschoff stated that the body loses weight at a faster rate than does the heart in every wasting disease. In addition, we feel that hypertension and generalized arteriosclerosis contributed to the normal or increased heart weights we observed. Hypertrophy of the left ventricle resulted from hypertension and arteriosclerosis, while the frequent hypertrophy of the right ventricle occurred in response to emphysema. Myocardial infarcts as a result of coronary occlusion were equally distributed in both sexes, in contradistinction to the observations in younger age groups.

Though considerable atrophy and scarring of the kidneys were noted, sufficient normal tissue remained. The reason was that the sclerotic changes affected chiefly the larger and medium sized renal arteries, whereas the afferent and efferent arterioles of the glomeruli were relatively intact.

Arteriolosclerosis and fibrosis associated with round cell infiltrations of the fibrous tissue were observed in adrenals, pancreas, liver, ovaries, uterus, prostate, pituitary, and gastrointestinal tract.

The picture of cerebral arteriosclerosis has been frequently described (1, 2, 3, 5, 29). Emphasis has been given to the discrepancy between pathologic and clinical observations. Our material confirms these other reports. Ischemic softenings, seen in all types of psychoses, were found in 68 per cent of our patients. In all instances, the leptomeninges were thickened, the intracranial fluid was increased, and the basilar arteries were sclerotic. Brains weighing less than 1,000 gm. were rare. Cortical atrophy was visible grossly, but the total weight was only moderately decreased because of congestion and increased fluid.

Increased deposits of iron were frequent in the extrapyramidal system around the capillaries, arterioles, and arteries, and within the walls of these vessels, especially in the globus pallidus. Other sites where iron was found in increased amount were in nerve cells of the extrapyramidal system and in amyloid bodies of the choroid plexus, pineal body, and pituitary. Such deposits of iron have been observed in these areas in younger people under diverse conditions (10, 15, 32, 34). In a few instances, calcium deposits were found together with iron in the same structures.

Argentophilic plaques were observed in large numbers in the gray matter of the cortex in 66 per cent of the patients. In a few instances such plaques were also seen in the basal ganglia and in the cerebellum. Alzheimer's fibrillary changes were often seen in conjunction with these plaques. In the remaining 34 per cent of the patients, only a few or no senile plaques could be found. In 12 per cent, a diagnosis of senile dementia had been made. This disparity between plaques and mental deterioration has been previously reported by others (3, 16). Numerous plaques have been observed in the mentally normal aged person (11, 16, 30). The different theories concerning the formation and origin of the argentophilic plaques have been discussed by many authors (3, 4, 16, 17, 18, 19, 20, 24, 25, 26, 27, 28), and will not be repeated in this paper.

Associated with a decrease of parenchyma of the organs, there was frequently an increase of lipofuscin. Large amounts of this "wear and tear" pigment were noted in the myocardium, the liver, and the adrenals, and in the nerve cells of most parts of the brain. Besides lipofuscin, the lipoids were increased in these organs and cells, in the islet and acinic cells of the pancreas, and in the cells and the interstitial tissue of the anterior pituitary. The increased lipofuscin and lipoid granules in organs of senile patients are of doubtful importance

since similar observations are not uncommon in younger patients under varying conditions (7, 22). In this latter regard, the lipoid content of the anterior pituitary has been especially studied (13, 23, 35). Fibrosis of this gland has been reported in obesity (14). In this study, fibrosis, increased lipoid content, and a relatively increased number of basophilic cells with vacuoles were not confined solely to the obese group but were found in most patients.

Also conspicuous was a frequent fatty metamorphosis of the liver and fat infiltration of the myocardium and pancreas, especially in the obese patients.

The patients showed a distinct tendency to fatal respiratory infections. Although frequently pneumococci were found in smears from the lungs, the picture was always that of a bronchopneumonia. No true lobar pneumonia was observed, in contradistinction to a recent review of pneumonia in the aged by Zeman and Wallach (21). In 70 per cent of the patients, bronchopneumonia was associated with either a cerebral vascular accident or arteriosclerotic heart disease. In an identical percentage, pleural adhesions, chronic pneumonitis, anthracosis, and emphysema were observed.

A decided tendency to decubital ulcers was also noted, the mental condition of the patients having often interfered with their care. To a lesser extent were observed subdural hemorrhages and fractures of the hip indicating a proneness to accidents. Also phlebothrombosis of the legs, terminal endocarditis (endocardiosis, 31), gastromalacia, and hemorrhagic ulcerations of the upper gastrointestinal tract were not infrequent. Malignant tumors and active tuberculosis were rare in this series of older patients.

Summary

The general pathologic changes in 50 patients who died in a mental hospital between the ages of 80 and 94 years have been described. Psychoses not related to senile or arteriosclerotic processes were included in this study, although most patients were diagnosed as having senile or arteriosclerotic psychoses. The common pathologic picture presented by these patients was a combination of degenerative vascular and parenchymatous processes of varying degree which involved all organs.

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Conditions Desirable for the Rapid Progress of Gerontological Research

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DR. KORENCHEVSKY, INSTRUMENTAL IN THE FOUNDATION OF THE CLUB FOR RESEARCH ON AGEING, ADDRESSED THE FIRST CONFERENCE OF THE BRITISH BRANCH OF THE CLUB, HELD ON JULY 16, 1946 AT THE IMPERIAL COLLEGE, LONDON. THE ADDRESS WAS ORIGINALLY PUBLISHED IN THE *British Medical Journal*, SEPT. 28, 1946, AND IS HERE REPRINTED, WITH ADDITIONS BY THE AUTHOR, THROUGH THE COURTESY OF THAT PUBLICATION. ALL STATEMENTS IN THE SUMMARY HAVE BEEN APPROVED BY THE CONFERENCE OF THE BRITISH BRANCH OF THE CLUB FOR RESEARCH ON AGEING AS EXPRESSING THE VIEWS OF THE CONFERENCE, AND HAVE BEEN PASSED AS RESOLUTIONS BY THE CONFERENCE.

THE conditions necessary for the *rapid* progress of gerontology are much the same as those required for the rapid advance of any difficult and complicated problem of science or medicine. In the first place the very great difficulty of the problem of ageing must be strongly emphasized. It is as difficult as, or perhaps more difficult than, the splitting of the atom, provided that the aim of gerontology is fully faced. This aim is not only a longer life but a stronger one—"to add life to years, not just years to life"—not only prevention of the premature appearance of senile decay but also elimination of those pathological features which are not necessarily associated with normal old age, since they are not present in some rare cases of less pronounced pathological ageing (for example, senile mental deterioration, effects of improper nutrition, accumulation of and autointoxication with metabolic products, gastrointestinal autointoxication, hypertension, arteriosclerosis, and certain disorders in the functioning of such vital organs as the heart, liver, kidneys, and glands of internal secretion). As ageing starts very early, actually with the *normal* process almost the whole of the span of human life will be changed, and therefore in some distant future man will probably become in some respects a different creature.

In short, science and medicine confront the task of preventing the present definitely premature and pathological ageing.

Here, however, is another great difficulty, because we do not know what are normal ageing and normal old age, what is a normal span of life, and for how long in normal ageing wear and tear could be prevented in different organs and tissues. Moreover, the basic elements and conditions of normal life, such as proper nutrition, are most probably still very far from ideal in spite of the truly remarkable progress in this field of physiology and medicine.

At the present time, in geriatrics (the medical treatment of old age) the greatest pitfall appears to be the temptation to use stimulating compounds only, of any origin and structure, in order to prevent pathological ageing (Dr. Voronoff's glandular grafts, hormones, Prof. Bogomoletz's reticulo-cytoxic serum, etc.). The danger and disadvantages of these geriatrical methods are twofold: (*a*) *A degenerated* old tissue or organ cannot stand vigorous stimulation, just as a tired horse, when whipped to do extra work, cannot withstand the strain and suddenly collapses from heart failure. (*b*) The causes, producing decreased function or morphological changes of certain organs and tissues and acting from elsewhere, are not removed by stimulating these organs. Therefore with such treatment the basic causes of ageing of organs or tissues will still be present and will continue to produce fatal effects. The condition is somewhat similar to that in which

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an overtired and overworked man in order to finish some urgent work, stimulates himself by taking coffee. For some time the caffein increases his efficiency, but if he persists in taking it, sooner or later a collapse will occur, in spite of any amount of caffein. This is because toxic products of fatigue not only remain but continue to accumulate in the organism.

The "elixir of life" appears to consist mainly in elimination of all abnormal causes of ageing, and not in the use of stimulating compounds only. This statement, however, should not be misunderstood. Of course, various stimulating compounds (vitamins, hormones, etc.) are naturally present in the organism, and their absence or decreased production might also become one of the important causes not only of premature ageing but of death. Therefore their role in geriatrics might be very important and, in some cases of deficiency of these compounds, be not only rejuvenating to a certain degree but might actually save the life of the organism. With regard, however, to the general basic causes of ageing and the respective approaches to their treatment, it is important to allocate a proper place to stimulants and urge their correct application in geriatrics.

Taking into consideration all the enormous difficulties of gerontological and geriatrical research *involving all branches of science and medicine*, the following conditions appear to be necessary for a *rapid* advance towards a solution of this vital problem of humanity:

(1) Just as in the case of the splitting of the atom, co-operative research work of scientists and medical men of all civilized countries is necessary. With this aim in view, the Club for Research on Ageing has been established with branches already formed in England, U.S.A., France, Denmark, Sweden, and Switzerland and a society in Argentina; branches in other countries are in a state of formation or, as we hope, will soon be established.

(2) Large funds must be available for financing gerontological research in all its manifold aspects. The grants, given for a few years, will not tempt many research workers to become specialists in gerontology and geriatrics, since any clinical and experimental research scheme on ageing necessitates some years of careful work. For example, it takes about 2½ years to breed old rats before starting any experiments on them. Besides, the research worker has to think about his future and that of his family.

(3) The establishment, in each major country, of an Experimental and a Clinical Institute for Research on Ageing.

(4) The formation of a sufficient number of groups of gerontologists and geriatricians in each civilized country. Obviously points (2) and (3) are essential for this purpose.

(5) The continuation of the policy of interesting in gerontology different existing biological and medical laboratories and research hospitals so that they devote at least some of their efforts and time to research on ageing. Co-operation between scientific bodies and municipal hospitals

and infirmaries for old people is most desirable, as the experience of the British Branch of the Club has shown in the case of co-operation with the London County Council. Long-term grants, of at least five years' duration, are necessary in these cases. Experience has also already shown that voluntary workers without remuneration, and "temporary gerontologists" (i.e., those who have agreed to do some gerontological research for a few years only), are often not to be counted upon for any length of time because of the call of their direct duties or the acceptance by them of permanent posts elsewhere.

Summary

For the *rapid* advance of gerontology and geriatrics the following conditions are desirable: (1) Co-operative research work of scientists and medical research workers in civilized countries. (2) Large funds for financing this research. (3) The establishment of experimental and clinical Institutes for Research on Ageing in major countries. (4) The formation of groups of research workers in gerontology and geriatrics. (5) Large long-term grants to existing scientific and medical laboratories and research hospitals who will agree to start gerontological or geriatrical research work.

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Chronic Progressive Subcortical Encephalopathy—Report of a Case

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IN A SERIES OF 8,900 AUTOPSIES AT ST. ELIZABETHS HOSPITAL, ONLY ONE INSTANCE WAS FOUND OF THE TYPE OF DEMYELINATING PROCESS OF THE BRAIN FIRST DESCRIBED IN 1894 BY BINSWANGER AND KNOWN AS CHRONIC PROGRESSIVE SUBCORTICAL ENCEPHALOPATHY. THERE IS A DIFFERENCE OF OPINION AMONG THE OBSERVERS WHO HAVE REPORTED THE RARE CASES OF THIS DISEASE AS TO WHETHER OR NOT IT IS CAUSED BY ARTERIOSCLEROSIS. MISS NEUMANN, REPORTING ON THE CLINICAL AND AUTOPSY FINDINGS IN THE ONE CASE FROM ST. ELIZABETHS HOSPITAL AND DISCUSSING OTHER REPORTED CASES, BELIEVES THAT CHRONIC PROGRESSIVE SUBCORTICAL ENCEPHALOPATHY IS FOUND ONLY COINCIDENTALLY IN CONJUNCTION WITH ARTERIOSCLEROSIS.

A DEMYELINATING process of the brain of the type to be described in this report is unique in a series of 8,900 autopsies at St. Elizabeths Hospital. A selective degeneration of the white matter with preservation of the cortex, confined usually to the temporal and occipital regions, and occurring in individuals past the fourth decade of life, was first described by Binswanger (1) in 1894. He called this condition chronic progressive subcortical encephalitis, although he considered the process noninflammatory and the result of cerebral arteriosclerosis affecting chiefly the vessels of the subcortex. Alzheimer (2) also considered the demyelinating process to be the sequel of a special form of arteriosclerosis.

The disease has no unique clinical features. The course of the subcortical demyelination is usually slowly progressive and extends over a period of many years. Convulsions are generally a concomitant feature at a late stage of the disease.

Farnell and Globus (3) reported a case of subcortical demyelination and suggested a change in name to chronic progressive vascular subcortical encephalopathy. Another instance of subcortical demyelination, apparently as a result of arteriosclerosis, was reported by Davison (4) in 1942. The clinical picture in these last two reported cases is dissimilar.

While there was another case of probable progressive degenerative subcortical encephalopathy in the series from St. Elizabeths Hospital, it did not fall within the classical Binswanger group, since there were, in addition, multiple disseminated foci of demyelination, as well as numerous other pathologic changes and practically no evidence of arteriosclerosis. The extensive subcortical demyelination occurred chiefly in the frontal lobes, where there was pronounced atrophy and extensive dilatation of the anterior horns of the ventricles. The patient, a woman of 47, showed progressive mental and physical deterioration. This case will be reported on later with a group of others in which there was symmetrical ventricular dilatation.

In the case reported on in the following pages, psychotic symptoms manifested themselves before any neurologic signs appeared.

CASE REPORT

History.—The patient, a white woman of 62, was admitted to St. Elizabeths Hospital July 23, 1928. There was a history of a "nervous breakdown" in 1913 (when the patient was 47), accompanying the menopause. She was not hospitalized at that time and recovered within a year. Following her husband's death in 1921 she became increasingly nervous and unhappy, believing that she had caused his death

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through an overdose of digitalis. In November, 1927, she took five veronal tablets with suicidal intent, resulting in an interval of unconsciousness. On recovery, she believed her body was separated at the waist and after coming together again it did not feel the same.

There was no history of psychopathy in her family. She was the third of seven children. She had always had a tendency to worry and was considered hypochondriacal by her family physician.

She herself applied for admission to the hospital. The record states that she was restive, resistive, antagonistic, excitable, abusive, and sometimes facetious. She refused to answer questions. Physically she was sallow, anemic, and undernourished. There was tremor of the hands and hypoactive patellar reflexes. She referred to herself as "a dirty old rag," and continued to do so throughout her fifteen year period of hospitalization. At the admission conference a diagnosis of senile dementia (presenile stage of senility) was made.

Early notes state that she seldom talked, but that when she did she was unfriendly and sarcastic. She paced the halls continuously. A nocturnal convulsion was reported June 28, 1929, and four more on March 31, 1931. There were no residual signs. Subsequent "convulsions" were occasionally reported in the ward and physician's notes. It was stated that when the attacks occurred during the day they lasted only one or two minutes. During this time she appeared dazed, and leaned against the wall. She never fell. It was said that when she tried to talk and couldn't she cried. She said she did not have spells, but the physicians were not sure whether she had no recollection of them, or would not discuss them. The attacks were considered epileptic equivalents at that time. Later notes refer to them as "arteriosclerotic convulsions."

On Aug. 18, 1936, convulsive seizures were severe enough to cause hospitalization on the medical service. On rallying from stupor, she was found to have a left hemiplegia. This disappeared rapidly. She became fully ambulatory and showed no residuals of left leg paralysis, but had residual weakness of the left arm.

During 1937, admissions to the medical service became more frequent following convulsive seizures. There was increased weakness of the left side, and thickness of speech. Pupils were small, constricted, and reacted sluggishly to light and in accommodation. Blood pressure was 130/90. In April, a left facial weakness was reported. There was weakness and ataxia of the left upper extremity with loss of muscle volume. No apparent weakness was noted in the left lower extremity. There was hyperalgesia of the left upper extremity with limitation of motion and spasticity. Superficial reflexes were absent. There was no Babinski sign. Gait was feeble and shuffling. The patient did not cooperate for examination in the sensory sphere.

In December, 1938 it was stated that convulsions were not as frequent or severe as they had been in the past. She dragged the left leg. The left arm showed spastic paralysis. She remained resistive. There was fairly advanced peripheral arteriosclerosis. Flexion contractures appeared in the left leg, arm at elbow, and in the left hand. The muscles of the left extremities were atrophic. Deep reflexes were hyperactive on this side.

Blood pressure was elevated in the last

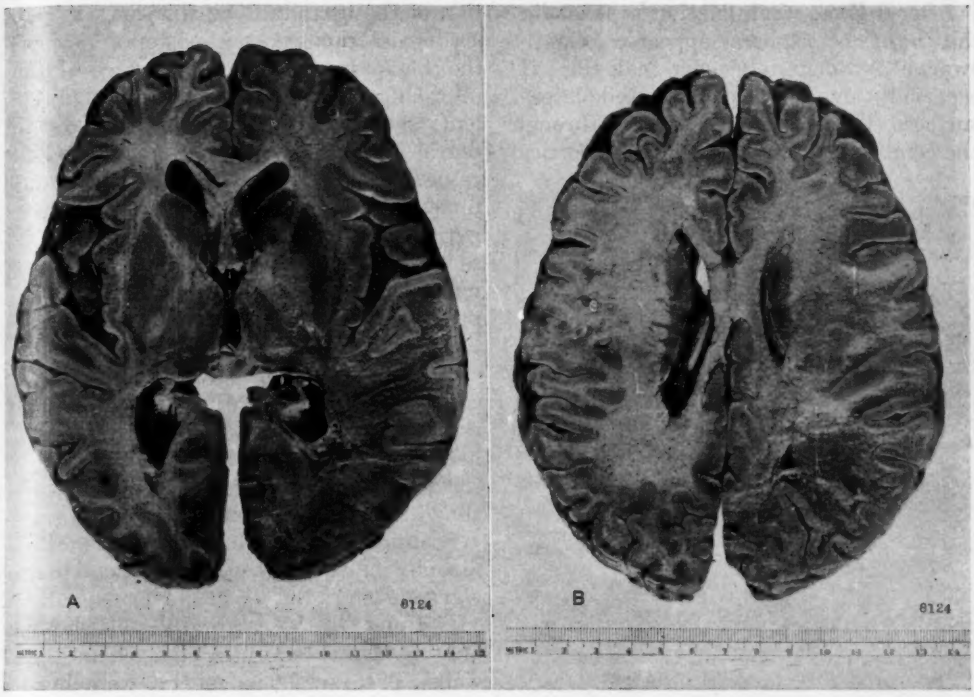

FIG. 1. A. Large area of subcortical demyelination in right temporo-occipital region and posterior region of thalamus and internal capsule. B. Subcortical focus of demyelination in right hemisphere, parieto-occipital region. Recent softening in center of left hemisphere.

three years of life. The patient was always extremely untidy in habits and appearance. By March, 1942, the clinical notes stated that she could not walk and sat quietly in the day room, paying no attention to her surroundings. No convulsions were reported in her final years.

Death occurred Feb. 16, 1943, at the age of 77. Clinically the patient had a terminal cerebrovascular accident and hypostatic pneumonia.

Necropsy Findings.—The immediate cause of death was determined to be an acute bronchopneumonia. There were flexion contractures of both lower extremities and of the left hand. The aorta and its large branches, the coronary arteries, and the mitral valve showed sclerotic changes. Nephrosclerosis was also present. The inner surface of the calvarium showed extensive hyperostoses of the frontal bone. A meningioma, about the size of a walnut, caused compression atrophy of the right temporal pole. Another smaller dural tumor was found to the right of the falx. Aside from the focal compressions caused by these growths, the contour of the brain remained unchanged, even a little flattened. However, a large area of softening was palpable in the right cerebral hemisphere, involving almost the entire parietal lobe and the posterior portion of the temporal lobe. The right precentral area was also involved. The surface of the brain was pale, not at all discolored, in the area of decreased consistency. The lesion was evidently old as there was decrease in size of the right half of the pons and right pyramid. Arteries at the base of the brain showed numerous yellowish plaques, but their lumens were patent and wide.

After a three week fixation in formalin, the right hemisphere appeared slightly swollen and definitely paler than the left, especially over the convex and lateral surfaces. Three horizontal sections through the cerebrum showed extensive subcortical degeneration with complete sparing of the cortex overlying the damaged area. In the most ventral section (fig. 1 A), it was observed that the entire white matter lateral to the posterior horn had a grayish, gelatinous appearance characteristic of demyelinating processes. The mesial portion of the occipital lobe was spared. The lesion also involved the posterior part of the thalamus, the sublenticular part of the internal capsule, and a small portion of the lenticular nucleus. On the two parallel dorsal sections the destructive process became less extensive (fig. 1 B), so that at the upper level only the central cores of the gyri were involved while the centrum semiovale remained undamaged. The normal configuration of the brain with well preserved cortex was in striking contrast to the widespread damage to the subcortex.

FIG. 2. A. Right parietal lobe. Demyelination of subcortex, preservation of cortex. Weil myelin sheath stain. B. Same area as in fig. 2A. Replacement gliosis. Phosphotungstic acid hematoxylin stain. C. Left hemisphere, showing patchy demyelination in area of recent infarction. Weil myelin sheath stain.
(100 mm. Summar. Wratten filters A & B)

In the section through the body of the corpus callosum (fig. 1 B) there was a poorly defined area of softening in the left hemisphere near the middle of the lateral surface. There was irregular grayish mottling in the area of infarction.

Sections of the brain stem showed atrophy of the descending cortical pathways on the right.

Cut ends of the cerebral vessels showed only moderate sclerotic changes in their walls. The vessels in general were hypoplastic.

Microscopic Findings.—There was almost total demyelination of the subcortex in the section from the right parietal lobe (fig. 2 A). Only scattered fragments of myelin sheaths with small focal swellings remained in this area. Relatively few arcuate fibers were intact. The damaged white matter was replaced by a meshwork of astrocytes and their fibrils (figs. 2 B and 3 A). The replacement gliosis was most prominent beneath the well preserved gray matter. Gitter cells were scattered in the glial meshwork. Perivascular infiltrations of defense reaction cells were absent. Blood vessels showed only slight thickening and hyalination of the walls (fig. 3 B).

The excellently preserved cortex showed no apparent loss of nerve cells. However, the neurones had pale, scanty perikarya. There was slight proliferation of glial elements in the outer layers. In the deeper lamina, hypertrophied microglia and swollen macroglia with deeply stained cell bodies (gemästete glia) were occasionally

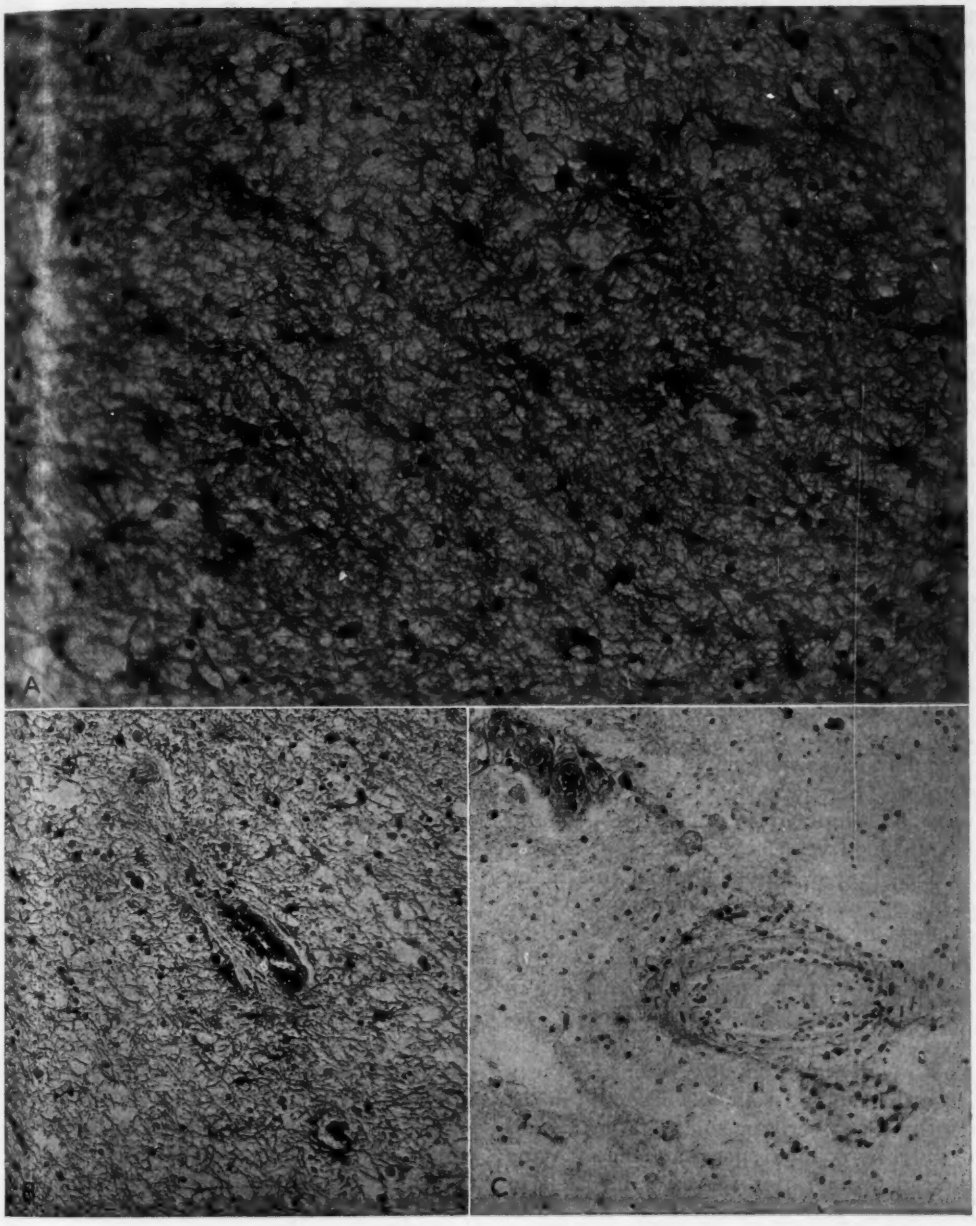

FIG. 3. A. Replacement astrocytosis in right parietal lobe. Phosphotungstic acid hematoxylin stain. 8 mm. objective. Wratten filters B & G. B. Slightly thickwalled vessel in area of subcortical demyelination in right hemisphere. Phosphotungstic acid hematoxylin stain. 16 mm. objective. Wratten filter KI. C. Occluded vessel in area of recent infarction, left hemisphere. Hematoxylin-eosin stain. 16 mm. objective. Wratten filters B & KI.

seen. The stripe of Baillarger, as well as some of the vertically directed fibers, retained the myelin sheath.

A section from the right basal ganglia and thalamus showed sharp delimitation of the demyelinated area. The insula and extreme capsules were spared. The habenula and stria medullaris were well myelinated. The medial and lateral parts of the thalamus showed a fairly normal structure, except for proliferation of astrocytes in the lateral thalamic nuclei. The nervous parenchyma of the pulvinar was almost completely replaced by astrocytes and a more or less dense meshwork of glial fibrils. Fragments of swollen myelin were scattered in the scar. Some well myelinated fibers traversed the rostral extremity of the lesion, possibly indicating a selective factor in the disease process. Other structures involved in the demyelinated focus were the external capsule, the retrolenticular part of the internal capsule, and the adjacent portion of the posterior limb. The tail of the caudate nucleus and the caudal half of the external medullary lamina of the thalamus were destroyed. Dilated perivascular spaces were noted throughout the section. There was occasional slight perivascular lymphocytic infiltration. A number of blood vessels in undamaged as well as degenerated regions showed thickening of one or more coats and sometimes hyaline changes in their walls. The vascular degenerative changes were never pronounced.

The section from the area of softening in the left hemisphere showed patchy demyelination of the subcortex (fig. 2 C). This lesion was evidently recent. A fairly large thrombosed vein was observed in the depths of an overlying sulcus. Other vessels in the subarachnoid spaces and parenchyma showed proliferation of the lining cells or thickening and hyalination of the walls. There were perivascular infiltrations with polymorphonuclear leukocytes, lymphocytes, and swollen macrophages in the lesion. The infarction involved portions of the gray matter which exhibited loss of nerve cells and slight proliferation of macro- and microglia. Focal congestion and a few tiny hemorrhages were observed. Small thrombosed vessels were noted in or near the areas of tissue rarefaction (fig. 3 C).

Two levels through the pons showed, in addition to degeneration of the right corticospinal and corticopontile tracts, an unusual pigmentation of the pontile nuclei associated with the atrophic pathways. The majority of the greenish black granules were engulfed in the cytoplasm of the nerve cells, but some were free or phagocytosed by the glia. The source of the pigment was not determined. Pontile nuclei in other areas showed no such inclusions. Extreme proliferation of oligodendroglia was observed in the pigmented nuclei. Vascular degeneration was not pronounced. Small recent hemorrhages had occurred in areas of focal congestion. The atrophy of the right corticospinal tract was traced in the medulla oblongata and upper cervical cord.

The cerebellum showed moderate arteriosclerotic changes but no focal lesions.

Comment

It is believed that the lesions in the right and left cerebral hemispheres had a different etiology. On the right side, the widespread destruction of white matter and good cortical preservation, replacement gliosis, and absence of inflammatory reaction place the condition in the heterogeneous group of demyelinating diseases classified as diffuse sclerosis. On the left side, the patchy multiple foci of demyelination in the subcortex and small lesions in the gray matter were undoubtedly the result of a recent interference with the blood supply. Sclerosis of the arteries was not confined to the large degenerative focus in the right temporo-parieto-occipital region but was found in all sections of the brain studied. The final histologic picture of the large lesion of the right side was far different from that observed in ordinary cases of cerebral arteriosclerosis. There was no distortion of the brain: The damaged area retained its normal contour. Grinker (5)

states that the lesion of Binswanger's disease is similar to that of any ischemic softening. This is not confirmed. There was no cystic degenerative area traversed by mesodermal elements, no peripheral gliosis, but a more or less uniform distribution of astrocytes with a few gitter cells in the region of axonal atrophy.

Discussion

It could, of course, be argued that the left-sided lesion represented an early stage of a progressive degenerative process similar to that which culminated in the widespread demyelination in the posterior part of the right cerebral hemisphere. To offset such an hypothesis, the microscopic changes observed in the left hemisphere were not dissimilar to those seen in most other cases of recent thromboses. Furthermore, arterial degeneration was not confined to the two lesions: It was observed in all portions of the brain examined and was apparently more severe on the left than on the right.

While arteriosclerosis is present in the reported cases (1, 2, 3, 4) of Binswanger's disease, it is not present in other cases of progressive subcortical encephalopathy. The fact that the histopathology of Schilder's and Binswanger's diseases is so similar—the site of demyelination, the preservation of the cortex, glial response, and lack of inflammatory reaction—points to a similar etiology. Neither disease gives a specific, readily definable clinical picture. The entity described by Schilder generally occurs before the age of 21, but occasionally later (6). Binswanger's disease has been described as appearing as early as 40 years (7), but generally occurs in individuals over the age of 50. With Binswanger's disease, according to most observers, the sclerosis of the cerebral vessels involves specifically those of the white matter. Wertham (8), on the other hand, believes that if the disease resulted only from arteriosclerosis, it would be found more frequently in connection with that condition. It seems to me, too, that since cerebral arteriosclerosis is such a common finding in individuals over the age of 50 years in the large series of postmortem examinations at St. Elizabeths Hospital, and since subcortical demyelination such as occurs in Binswanger's disease is so extremely rare, a more logical conclusion is that the simultaneous appearance of arteriosclerosis and subcortical degeneration of this type is merely accidental.

Summary

In 1928 a 62 year old white woman herself applied for admission to St. Elizabeths Hospital. She was extremely nervous and unhappy and had tried to commit suicide. There was no history of psychopathy in her family. A diagnosis of senile dementia was made at the time of admission. During the fifteen year period of hospitalization before her death, the patient suffered periodic convulsions, increased weakness of the left side, thickness of speech, and spasticity in the left arm. Death occurred in 1943, when the patient was 77 years old, of bronchopneumonia.

At autopsy, the aorta, the coronary arteries, and the mitral valve showed sclerotic changes. Nephrosclerosis was also present. The contour of the brain was unchanged, aside from focal compressions caused by two small dural tumors. However there was extensive subcortical degeneration. Microscopic findings showed almost total demyelination of the subcortex on the right side. The damaged white matter was replaced by a meshwork of astrocytes and their fibrils. The cortex was well preserved. On the left side, there were patchy multiple foci of demyelination in the subcortex and small lesions in the gray matter.

This is one of the few reported cases of Binswanger's disease, which is similar in histopathologic changes to the more frequently observed progressive subcortical encephalopathy known as Schilder's disease, except that Binswanger's disease occurs in late rather than in early life. Arteriosclerosis is not present in Schilder's disease, and hence is probably found in Bin-

swanger's disease only as a coincidence rather than as the cause of the disease.

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CURRENT COMMENT

Aging—Successfully and Creatively

During the winter of 1946–1947, two courses on aging are being offered in New York—"Aging Creatively" and "Are You Aging Successfully?" both under the direction of Dr. George Lawton, well known psychologist and author of books on old age.

"Aging Creatively" is being held under the auspices of the Cooper Union, on Monday evenings from November until March. The purpose of the course is to show how arts and crafts and recreation can satisfy man's needs over his entire life span, for the pleasure of creating requires little time, money, or energy, and is not dependent on the excellence of the work achieved.

The course will present case histories of older persons with a variety of needs to be satisfied, feelings to be expressed, and problems to be solved; how each person found a satisfactory creative outlet will be discussed. Practical information will be given about where an activity can be learned and the cost of the activity, and persons who became artists or craftsmen late in life will be invited to speak to the class and to exhibit their work.

"Are You Aging Successfully?" is a series of eight lectures by Dr. Lawton, given under the sponsorship of Town Hall Workshops Division. Aging successfully means making use of the undeniable gains that come with the years and dealing constructively with the losses. The many persons who, in their forties and fifties, feel life to be over endure a false rather than a real old age. To avoid "faces like lost battles" it is better to start early in life to plan for continuous self development and self expression, but no one is too old to enrich his life through a daily task he finds interesting, by working toward a goal.

The lectures are intended for all those who are willing to admit that someday they will start to grow older and who wish to plan for that time. Some of the lecture topics are: "So You Want to Live Long," "Old Dogs but New Tricks," "Retire To, Not From," and "A Bill of Rights for Old Age." Each of the meetings of the course will be opened by a forty-five minute presentation of the topic, followed by an informal discussion during which each member of the workshop will have an opportunity to contribute his ideas and personal experiences.

The establishment of the JOURNAL OF GERONTOLOGY has been made possible by a grant from the Josiah Macy, Jr. Foundation in support of the editorial office.

The hieroglyphics, "The Beginning of the Book for Transforming an Old Man into a Youth," at the top of this editorial page, are from the Edwin Smith Surgical Papyrus, translated by Professor John Breasted, University of Chicago Press.

City-Wide Recreation in Philadelphia

Although many cities have one or a dozen clubs for older people, nothing has yet been attempted like the city-wide Philadelphia plan for recreation for all older people.

About two years ago, many health and welfare agencies in connection with the Council of Social Agencies decided that Philadelphia should undertake a program for the organization of recreation clubs throughout the city for as many of the 136,000 people over 65 years of age as could be attracted and accommodated. The Philadelphia Recreation Association agreed to take over the project, and the Community Fund allocated money for the salary of a director.

Georgene E. Bowen was selected as director, and the actual promotion of the program began in the summer of 1946. "Since then schools, churches, hospitals, community houses, labor centers, playgrounds, housing projects, charitable institutions, and the city's Crime Prevention Association have expressed willingness to open recreation clubs for the aged," according to an article in the *Christian Science Monitor.*

Miss Bowen believes that activity increases longevity, and refers to statements by insurance companies, which report a pronounced decrease in the number of mortality policies paid during the war when many older people were busy working in defense plants. Miss Bowen believes that recreation can offer the same revitalizing benefits as employment.

The keynote of the program is to plan with and not for older people. They will be asked what sort of recreation they want, and no physical or mental limit will be placed on what they can do. "A wealth of creative productions may result from the program. Many of the city's aged were writers, painters, musicians, and craftsmen before they were relegated to the rocking-chair through various circumstances. Given an opportunity for renewed expression, with friendly competition to pepper their interest, the 'oldtimers' may turn out serious works of art borne of mature judgment, long experience, education, and a spiritual reawakening. Novices would derive fun just in working for their own amusement."

Part of the plan to organize clubs for older people is the training of leaders. To that end, an Institute for Orientation and Preparation of Leaders and Sponsors of Clubs for Older People was held in Philadelphia in October, under the auspices of the Philadelphia Recreation Association. The subjects of the institute included "The Technique of Club Leadership," "Folk Dances for Older People," "Simple Dramatics Older People Can Enjoy," "Leisure Time Opportunities in the Philadelphia Public Adult Evening Schools," "The Psychology of the Older Person," and "How to Refer Older People to the Community Health and Welfare Services."

The Francis Amory Prize

In compliance with the terms of a gift under the will of the late Francis Amory of Beverly, Massachusetts, the American Academy of Arts and Sciences offers a substantial prize for outstanding work addressed to the alleviation or cure of diseases affecting human reproductive organs. The gift provides a fund, the income of which may be awarded at seven-year intervals "as a prize and gold medal, or other token of honor or merit," to any individual or individuals for work of "extraordinary or exceptional merit" in this field. In case there has appeared work of a quality to warrant it, the next award will be made in 1947. Awards will be made for what in the judgment of the Committee on the Amory Fund appears to be the most outstanding contribution or contributions in the field as outlined and as based on published work and recognized accomplishment for the current seven-year period.

No formal applications and no essays or treatises from individuals are solicited, but suggestions will be welcome from any appropriate source that will be of aid to the committee in making a wise selection.

Recommendations may be addressed to Secretary, Amory Fund Committee, American Academy of Arts and Sciences, 28 Newbury Street, Boston, Massachusetts.

Antidote to Loneliness

In the historic old French Quarter in New Orleans there meets, on Wednesday afternoons, a group of men and women ranging from 55 to 90 years. "This group of elderly people have built their own little social organization unhampered by rules and management," writes Gladys Morrill in the September, 1946 issue of *Recreation*.

The Wednesday Afternoon Club had its beginnings in 1940 when the director of the Orleans Neighborhood Center, which was located in a neglected old mansion in the French Quarter, became interested in the old people of the neighborhood who had neither work nor friends nor recreation to fill up their time. She thought that if they could meet together occasionally over a cup of tea and become acquainted their lives would be more interesting to them. Accordingly a small number of old people were invited to the Center to discuss the formation of a club. Much interest was evinced, and the membership grew to twenty-two.

Musicians, actors, school teachers, evangelists, housewives—the makeup of the club varies widely, as do the interests of the members. However all are seeking companionship and self expression, and so the pleasure of the majority determines the actual entertainment.

When in 1942 the Center gave up its old building in the French Quarter, the school board offered to the Wednesday Afternoon Club the use of several rooms connected with the Cabrini Playgrounds. The rooms are well equipped, and the new meeting place has proved even more satisfactory than the old.

Boarding Homes in New York City

The Department of Welfare of the City of New York, aware of the great increase in the aged population and concerned about the adequacy of housing facilities for older persons, conducted, in late 1944, a study of boarding homes for the aged. The results of this study appeared in the February, 1946 issue of *Public Welfare*, in an article by Marie Galpern and Fannie Roncoli.

The study included only private boarding homes, in contrast to the eleemosynary homes for the aged. The great majority of the sixty-two boarding homes visited accommodated at least three persons, and were operated by landladies, living alone, who were largely dependent on the income they received from their boarders.

The purposes of the study were to obtain information about the type of care and service available to Department of Welfare clients in boarding homes, to develop certain standards for boarding homes, and to find vacancies for other clients in need of placement.

An investigator had a detailed interview with each landlady, and inspected the interior of the premises with especial attention to evidences of overcrowding, cleanliness, adequacy of furnishings, degree of privacy, and violations of fire laws. The visit was so timed that the investigator could be present at meal time to observe the quality and quantity of food served.

On the whole, it was found that the services provided were satisfactory, and often special services were offered, such as nursing care for protracted illness and personal shopping. Housekeeping and dietary standards were for the most part satisfactory. Recreation facilities were largely limited to freedom to the living room, porch, or yard to entertain guests, and access to a radio. On the whole, the rates charged were extremely reasonable.

The study, while it produced only fourteen vacancies, stimulated an interest in the problem of boarding homes. A central file has now been established at the Department of Welfare in order to give Welfare Centers correct information about existing vacancies and the adequacy of the various homes.

Conference on Chronic Illness

"What Chicago Is Doing About Chronic Illness" was the topic of a meeting of the Central Service for the Chronically Ill of the Institute of Medicine of Chicago, held Dec. 3, 1946 at the American College of Surgeons in Chicago.

The morning session was devoted to the discussion of prevention and control of the chronic diseases. Speakers were Leo M. Lyons, director of St. Luke's Hospital; Dr. Andrew C. Ivy, professor of physiology at the University of Illinois; Edna S. Newman, director of the Cook County School of Nursing; Dr. John A. Rogers, executive director of the Illinois division of the American Cancer Society; and Dr. Carl Peterson, secretary of the Council on Industrial Health of the American Medical Association.

The afternoon session related to the long-term care of chronically ill patients. The speakers were Samuel A. Goldsmith, director of Jewish charities of Chicago; Frank T. Loomis, executive director of the Chicago Community Trust; Raymond M. Hilliard, public aid director of the Illinois Public Aid Commission; Mary E. Westphal, director of the Visiting Nurse Association of Chicago; Dr. Roger W. deBusk, president of the Chicago Hospital Council; the Rev. A. J. Munsterman, superintendent of a home for the aged; Kathleen Cronin, superintendent of a private nursing home; and Edna Nicholson, director of the Central Service for the Chronically Ill.

Compulsory Retirement?

That compulsory retirement on a calendar age basis should be abandoned was the contention of Dr. Theodore G. Klumpp, president of a well known chemical company, in an address before the American Public Health Association, in November, 1946.

"Society," he said, "has been quite illogical and inconsistent in its attitude toward the older worker. On the one hand, we have no objection to electing and appointing older individuals to positions of the greatest responsibility in government, business, and the professions. And yet, as far as the rank and file of workers is concerned, we impose blind and unselected compulsory retirement rules which automatically eliminate those in the ranks who have reached a certain age, regardless of their fitness, ability, and contribution to the group for which they labor."

Dr. Klumpp suggested that the major burden of caring for the aged "can be carried by the extension of voluntary retirement plans in which the employer and the employee share the cost."

Recognizing the social problems implicit in the increase in the older population, Dr. Klumpp offered this seven-point program:

1. Since physiologic age is not synonymous with chronologic age, compulsory retirement on a calendar age basis should be abandoned.

2. Since hiring is selective and based on fitness to do a given job, retirement should likewise be selective and based on unfitness.

3. Compulsory retirement should be based on the recommendation of a retirement board composed of medical and psychiatric members as well as administrative officials.

4. If wage in proportion to performance is recognized as a fundamental principle, the older worker should taper off in industry, just as the young apprentice gradually works himself up in skill, performance, and remuneration. In other words, opportuni-

ties for down-grading in position and salary should be offered.

5. Industry and governmental and private institutions must make a greater and more intelligent effort to employ partially disabled persons.

6. When the aged and disabled have work to do, they are less of a burden, financially, socially, and spiritually, to the folks at home. Other things being equal, home environment is better than an institution for the aged and disabled.

7. Institutions for the aged and disabled must be changed from asylums to modern institutions where every convenience and scientific development is available for their physical, mental, and spiritual comfort.

Borrowed-Time Club

In Evanston, Illinois a group of older men and women, whose average age is 75 years, meets every Tuesday afternoon from 2 to 4 o'clock. The meetings, held in the Covenant Methodist Church, attract an attendance of around seventy-five. In the eight years of its existence, 450 persons have joined the club, and 8 of the 15 charter members are still alive, 6 of them active.

The first Tuesday of the month is known as "Club Day." Tea, coffee, and cake are served, and the members whose birthdays fall in the current month are honored. On Club Day, a voluntary collection is taken up, there being no regular dues or fees.

The slogan of the club is "To provide entertainment and cultivate a spirit of good fellowship." When the roll is called at the beginning of meetings, many of the members present answer with a song, a story, or a personal experience. The club has its own song book, and some of the songs have been written by the members. The entertainment includes instrumental and vocal music furnished by local orchestras and individual musicians, and book reviews, lectures, and movies, provided without charge by clergymen, university professors and business firms. Special holidays have special celebrations.

The club is nonsectarian, and, on invitation, the members attend different churches in a body, sometimes fifty at a time.

There is a committee to call and report on sick and absent members, and a monthly newsletter is mailed to every member.

The president of the club says, in a letter to the JOURNAL OF GERONTOLOGY: "We are a happy bunch of all kinds and conditions of people, rich and poor, intellectual and uneducated, one for all and all for one. God helps the man who helps himself."

Information, Please

The information bureau of the Welfare Council of New York City, 44 East 23rd Street, has prepared, for the Conference Group on Welfare of the Aged, a booklet on "Recreation Facilities for Older People." It contains information about recreation centers for older people, and other organizations and courses offered in the New York area in 1946–1947 which would be of interest to older people.

Illinois

Effective Oct. 1, 1946, maximum allowances for the aged in the state of Illinois were increased $5.00 a month. Previously, $40.00 was the maximum assistance granted, but through the action of the state government the amount was increased to $45.00. Also effective Oct. 1, 1946, the federal government increased by a maximum of $5.00 a month its share in the old age assistance payment. Thus it is now possible for the aged to receive $50.00 a month where the need justifies it.

To provide better service for the recipients of old age pensions, the Illinois Public Aid Commission recently adopted a procedure to issue emergency assistance to those who suffer loss by fire, unexpected loss of employment income, and certain other mis-

fortunes. In the past, charitable agencies have had to take over until the normal processes of state disbursement could function. Under the anticipated plan, aid would come within twenty-four hours from a revolving fund created from a trust fund in the state treasury, which fund is under the personal jurisdiction of the governor of Illinois.

Jewish Home for the Aged

In May, 1903 came the formal opening in Chicago of a home for indigent aged among the Jewish population. Since that time the Orthodox Jewish Home for the Aged has grown and developed until now it occupies a landscaped five acres and houses 164 residents.

Of great importance is the 31-bed, well equipped hospital and the 40-bed infirmary. A physician makes daily rounds and is on call for emergencies, and there is an adequate nursing staff. The facilities of Michael Reese and Mt. Sinai Hospitals are also available.

Religious services and a daily study period under the direction of a rabbi are great factors in the morale of the home. There are occupational therapy classes under the leadership of a professional therapist, in which the residents are enabled to follow the type of work in which they were most proficient before entering the home. Many help in the home, on a voluntary basis, in such capacities as setting the tables and preparing the meat and poultry as prescribed by ritual.

Recently, music therapy classes have been instituted and have proved of immense value. "Taking part in the art of song, which they had perhaps long forgotten, lifts the spirit of our aged. . . . There is an awakening which penetrates even into the dream world of our many senile dementias, recalling from the dimness of their consciousness words and melodies lying dormant in their thoughts. There is enthusiasm and happiness which nothing but mass singing could have brought forth. These classes unite the blind, the handicapped, the senile, and the normal aged into a great harmonious entity."

Old people from the community are invited to participate in any of the activities of the home, but the home, with its present facilities, cannot accommodate all the needy old people who seek admission. In 1945, out of 175 applicants only 52 could be admitted. A new residence building for 90 persons and an expansion of the hospital and infirmary services are at present contemplated.

The success of the home is undoubtedly the result of its philosophy, as expressed by the superintendent, Mrs. Julius Savit: "In line with the most modern thinking, we know that it is not enough merely to prolong life. We must also make that life worth living."

Psychology and Gerontology

There has recently been formed a new division of the American Psychological Association, called the Division of Maturity and the Older Ages. The officers are: Dr. S. L. Pressey of Ohio State University, divisional president; Dr. H. S. Conrad, secretary-treasurer; and Dr. W. R. Miles and Dr. George Lawton, divisional representatives.

The division is concerned with development and change throughout the adult and older years, in the belief that the processes of aging are long-time processes and must be studied as they develop from youth.

Oregon Pension Measure

The only state to vote on a Townsendite measure in 1946 was Oregon. There the proposal was to authorize "a tax of 3 per centum on all gross incomes to create a fund sufficient to pay every qualified citizen of the state of Oregon, over 60 years of age,

and over 18 years of age if totally and permanently disabled, a monthly pension. . . . Recipients to spend proceeds received within 30 days thereafter and abstain from gainful occupations." The amount suggested for the pension was $100 a month.

The measure was bitterly fought over, arousing more argument than the campaigns for governor, Congress, and all other offices put together, according to an article in the St. Louis *Post-Dispatch*. A former candidate for governor of Oregon, who contested a similar measure when he ran for office in 1934, was the head of the pension campaign before the November, 1946 elections. The slogan of the campaign was "Be independent at 60." Oregon's present food allotment to aged welfare recipients is $23.45 a month, which amount is so low, supporters of the pension measure argued, that it could be a strong factor leading to a depression and to Communism. The usual Townsend argument was advanced that pensions would so increase purchasing power as to prevent depressions.

The opponents of the measure, while agreeing that present old age pensions leave much to be desired, contended that a 3 per cent tax levied every time a commodity changed hands would cause a depression by pyramiding costs so high that many businesses could no longer operate profitably in competition with those in other states requiring no such tax.

Pro-pension forces cited the gross income tax levied in Hawaii and Indiana as proof that such a tax is feasible. Anti-pension groups replied that Indiana has no other income tax and that the money is used for general government expenses, not just pensions, while Hawaii is removed from all nearby competitors and so is in a unique position.

The measure failed to pass, there being 87,272 votes cast in favor of it and 243,845 against.

CORRECTION: The references in the recent paper on "The Bible and Old Age" by John J. Griffin were stated to have come from the Apocryphal rather than the King James version of the Bible. While the books not found in the King James version are to be found in the Apocrypha, the entire list of references is taken from the Douay-Rheims version of the Bible, which precedes the King James by several years and which is the authentic text used in the Catholic Church.

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Club for Research on Ageing

The Club for Research on Ageing will meet in New York Feb. 3 and 4, 1947. It is a small group consisting of only twenty-four members. The present officers are: E. V. Cowdry, Chairman; E. J. Stieglitz, Secretary; and William deB. MacNider, Clive M. McCay, and Lawrence K. Frank, Executive Committee.

No formal papers will be presented, but each member of the Club and each invited guest will present a topic, emphasize its importance in the problem of aging, summarize available evidence pro and con, and lead the discussion relating to it. Some topics will require careful preparation in advance; others may well be presented more or less spontaneously. Among the subjects already planned for discussion are:

1. How can methods of histochemistry and chemical histology be best utilized in the study of aging?
2. Why does the mortality rate from almost every disease increase with advancing age at a progressively accelerated rate?
3. Does a moderate amount of coffee extend the life span?
4. How general is the phenomenon of resemblance by animals of a given litter in respect to life span?
5. What is being done to improve techniques for the clinical evaluation of functional reserves?
6. How does liberal and limited intake of water influence longevity?
7. What are the possibilities of "promoting anabolism" as a method of alleviating the difficulties of the terminal years?
8. What are the causes of tubular fibroses in advancing years? (This will lead into the problem of the Bogomolets' serum.)
9. What is the value of evidence that the offspring of young parents have a longer lifespan than the offspring of old parents?
10. What is the value of evidence that a given type of cancer develops more slowly in old than in young people?
11. Questions regarding the program of the newly established section on gerontology of the National Institute of Health.

There will also be a brief session for the conduct of business, including the election of new members and officers. The present chairman will be replaced by another member of the Club, on the principle that this serves to spread responsibility and to bring in new and valuable ideas as to management.

The Club for Research on Ageing is most grateful to the Josiah Macy, Jr. Foundation for its outstanding leadership in fostering research on aging, and particularly for its financing of the regular annual meetings of the Club, which have proved so helpful.

Notice of Call for Fourth Meeting of the Corporation and Council of the Gerontological Society, Inc.

Notice is hereby given that the fourth meeting of the Corporation and the Council of the Gerontological Society, Inc. (see Article VIII, Sections 1 and 2 of the By-Laws) is called for 4 P.M. Sunday, Feb. 2, 1947 at the Commodore Hotel, New York, New York.

The order of business will be:

1. Minutes of the third meeting of the Corporation and Council (pages 262–264, Vol. 1, Journal of Gerontology).
2. Report of the President.
3. Report of the Secretary.
4. Report of the Treasurer.
5. Report of the Editor of the Journal of Gerontology.
6. Report of Committee on Membership.
7. Appointment of Committees for 1947 (see Article V, Section 7, Subsection B of By-Laws).
8. Nominations for officers and members of Council for 1947 (see Article V, Section 6, Subsection F of By-Laws).
9. Old Business.
10. New Business.

HENRY S. SIMMS, *Secretary*

LEGAL ASPECTS

The following are extracts from the bulletins on state legislation, health and welfare, of the Social Security Board. Errors may occur in both bill numbers and titles.

ARIZONA

Blind Assistance—S. 13XXX. Permits inmates of private institutions to receive the benefits allowed for needy blind persons; provides that persons receiving old age assistance may be eligible for assistance to prevent blindness or restore eyesight. Introduced Sept. 20, 1946. Passed Senate Sept. 23. Favorable report in House Sept. 24.

Old Age Assistance—H. 1-XXX. Increases to $50 per month the maximum amount of assistance to be paid for old age assistance; provides for eligibility for such assistance. Introduced Sept. 9, 1946. Approved Sept. 30, 1946. Chapter no. 12.

LOUISIANA

Public Assistance—H. 166. Repeals Section 18, Act 359, Laws of 1938, as amended, relative to the recovery from the estate of a recipient of old age assistance or aid to the needy blind. Approved July 11, 1946. Chapter no. 62.

H. 167. Prohibits the withholding of information from the Department of Public Welfare by a recipient of public assistance concerning property and income. Approved July 11, 1946. Chapter no. 63.

MASSACHUSETTS

Old Age Assistance—S. 215. A resolution memorializing Congress to amend the federal laws relative to matching by the federal government of amounts expended by states and their political subdivisions on account of old age assistance. Adopted April 16, 1946.

H. 1643. Relates to insurance policies held by an applicant for old age assistance. Approved June 6, 1946. Chapter no. 460.

MISSOURI

Old Age Assistance, Eligibility—S. 23. Amends Article I, Chapter 52, Revised Statutes, 1939, as amended by an act, page 950, Laws of 1943, approved July 26, 1943, by enacting a new section to be known as Section 9406-a, establishing certain property values in determining eligibility of persons for old age assistance; provides a date when this act shall terminate. Introduced Jan. 30, 1945. Approved Oct. 15, 1946.

MISSISSIPPI

Appropriation, Public Assistance—H. 527. Makes an appropriation for financial assistance to needy aged persons, dependent children, and needy blind persons; also provides for child welfare services for the fiscal years 1946 and 1947; provides how such funds shall be expended. Approved April 4, 1946.

Old People—H. Res. 25. Condemns activities of certain individuals in their attempt to mislead the old people of the State of Mississippi. Adopted March 29, 1946.

NEBRASKA

Excerpts from message of Hon. Dwight Griswold, Governor of Nebraska, Aug. 22, 1946—" . . . The increase in the cost of living created a condition so that our present old age assistance law does not properly provide the minimum care for many of the recipients. Likewise an increase in the cost of building has made it impossible to construct some of the state institutional buildings for which you provided funds without so lowering the standards that they would not be economical units.

"On account of these changed conditions, I called this Extraordinary Session. . . .

" . . . Prior to my inauguration as governor in January of 1941, the income of the Old Age Assistance Fund had on several occasions been insufficient to pay the recipients the full amount which the department felt they needed. The income was increased, however, and during my first term as governor recipients were consistently paid on a 100 per cent basis throughout the entire twelve months of the year.

". . . in 1943 . . . I remember a conference . . . called by eight or ten legislators who were interested in seeing old age assistance properly financed. It was felt then that because of the war and rationing, the sale of gasoline and sale of liquor would both be radically reduced. It was the decision of the legislators attending that conference to present a bill increasing the head tax payment and also increasing the number of people who would be called upon to pay it. This was done in order to make up what was expected to be a deficiency in the income from gasoline tax and from liquor tax which went into the Assistance Fund.

"In spite of the war, however, the income from both gasoline tax and liquor tax held up very well, and with the added head tax, the Assistance Fund in the biennium beginning July 1, 1943 was much larger than ever before in the history of Nebraska. The cost of living was increasing and per capita payments to recipients were consistently raised, although the number of recipients decreased, due to war-time employment.

" . . . Your Appropriations Committee toward the close of the 1945 session discovered that there was an unexpended balance in the Assistance Fund of more than two and one-half million dollars (and) . . . therefore recommended that there be reappropriated to the Assistance Fund $1,230,844.09 of this unexpended balance, feeling that reappropriation would more than amply take care of all assistance grants during the biennium beginning July 1, 1945.

"The Legislature approved that plan, permitting $1,137,257.57 to lapse into the General Fund and thus reduce property taxes.

"Your decision in 1945 has been justified by future events. On Aug. 1, 1946 there was an unexpended balance in the Assistance Fund of $2,449,169.45. This means that in the period from July 1, 1945 to Aug. 1, 1946 the income in that fund was more than $1,200,000 greater than the expenditures. The fund today is more than amply financed, and the increase in the assistance grants which I am suggesting that you now enact can be taken care of without any increase in taxation. . . .

" . . . Beginning Oct. 1, 1946, the federal government will pay a maximum of $25.00 to each client, whereas the limit at the present time is $20.00 per client. As of today the State of Nebraska is fully matching federal aid, but the state law limits individual payments to $40.00 no matter how much the federal government is willing to furnish. Due to the increase in the cost of living I do not feel that the $40.00 payment is sufficient to meet the intent of this law, and I called this session of the Legislature so that you may increase it.

" . . . I would like to point out that in 1940 the average payment in Nebraska was $17.79, while the national average was approximately $20.00, this state being about $2.20 below the national average. For the month of May, 1946, the last for which figures are available, the national average was $31.99, while the average in Nebraska was $32.22, our state thus being above the national average. . . .

"There is much misunderstanding relative to the Assistance Law, and many suggest that payments be upon a flat or uniform basis. This is not provided for in either the federal law or the state law. Instead, both of them place the payments upon a "need" basis. This means that if there is any outside income it shall be

deducted from the payment the state makes. Increases in the cost of living should be provided for, however, and I feel it necessary that during this period especially budgets be revised often, and I likewise think it necessary that the maximum payment be increased. . . .

"In paragraph 2 of my Call you are authorized to amend Section 68-202 to redefine eligibility to receive old age assistance funds. This is suggested because of a request that people in county and municipal hospitals should be made eligible, whereas they are not so at the present time."

Old Age and Blind Assistance—R. 1X. Resolves that the state shall pay an additional $3.50 per month to meet the need for recreation in providing assistance for the aged and blind. Adopted Aug. 28, 1946.

Old Age Assistance—Bill no. 1X. Increases the maximum amount that may be paid per month to any person as old age assistance and as blind assistance; provides that medical, surgical, and hospital care shall be excluded in determining the maximum amount per month thus paid. Approved Aug. 30, 1946.

Bill no. 2X. Redefines who are eligible to receive old age assistance. Authorizes the payment out of old age assistance funds of hospital care for recipients of old age assistance confined in hospitals operated and maintained by any county or municipality within the state. Approved Aug. 30, 1946.

OHIO

Excerpts from message of Hon. Frank J. Lausche, Governor of Ohio, Aug. 20, 1946—"The 79th Congress of the United States before adjourning determined that the aged, the blind, and the dependent children of the nation were entitled to increased financial aid to meet the increased cost of living. . . .

"Under the present law of Ohio, the most that can be paid to any eligible aged or blind person is $40.00 per month, of which the state and federal government each pay $20.00. . . .

"I recommend that a law be enacted by this body which will permit the payment of $50.00 monthly to each eligible aged and blind person, of which the State shall contribute a maximum of $25.00 and the federal government a maximum of $25.00. . . .

"I do not believe that any general overhauling of aid for the aged should be undertaken by this special session, but rather I believe that it should confine the emergency legislation to increases in allowances and leave changes in the basic system for consideration by the next General Assembly."

Old Age Pensions—S. 367XXXX. Permits the payment of a $50.00 maximum old age pension. Approved Sept. 5, 1946.

RHODE ISLAND

Old Age Pensions—H. 1015. A joint resolution urging Congress to give greater federal aid to states for old age pensions, and for aid to dependent children. Adopted April 12, 1946.

SOUTH CAROLINA

Old Age Assistance, Residence—H. 1000. Prescribes the necessary length of residence in this state for a person receiving old age assistance. Approved March 25, 1946. Ratification no. 703.

Old Age and Survivors Insurance—H. 817. A resolution memorializing Congress to enact legislation reducing the age limit relating to old age and survivors insurance and to provide disability benefits to commence with disability. Adopted Jan. 22, 1946.

VERMONT

Appropriation, Old Age Assistance—H. 10X. Makes an appropriation of $50,000 for old age assistance. Approved Sept. 28, 1946.

Old Age Assistance—H. 8X. Provides for increased aid for old age assistance. Approved Sept. 28, 1946.

H. 9X. Relates to old age assistance. Approved Sept. 28, 1946.

VIRGINIA

Aged, Homes for—S. 69. Authorizes local boards of public welfare of counties and cities to enter into agreement with the authorities of other counties and cities and with certain approved homes, for the maintenance and care of certain indigent aged, infirm, chronically ill or incapacitated persons. Approved Feb. 28, 1946. Chapter no. 68.

S. 72. Authorizes the State Board of Public Welfare to fix standards and make regulations for the operation of certain homes for aged, infirm, chronically ill or incapacitated persons; requires compliance with such standards. Approved March 2, 1946. Chapter no. 80.

Assistance, Eligibility—S. 70. Amends the "Virginia Public Welfare and Assistance Act of 1938," relating to the eligibility of aged persons, dependent children and blind persons for aid and assistance under the act. Approved March 9, 1946. Chapter no. 133.

WYOMING

Old Age Assistance—S.J.R. 1X. Proposes a constitutional amendment that "any home, hospital or other institution established by the State for the care of the aged or infirm persons" not be under the control of the State Board of Charities and Reform. Approved April 25, 1946.

H. 17X. Provides for the establishment of "The Wyoming Home for the Aged." Law without approval May 7, 1946.

GERONTOLOGIC reviews

OVARIAN CHANGES WITH AGING

In 1672 Regnerus deGraaf gave the name of ovaries to those female organs which until then had been called *testes muliebris*. In the light of some ovarian investigations of recent years, the original terminology of the early anatomists might not have been amiss, at least in some cases.

A reiteration of some basic embryologic concepts may be of aid in the interpretation and integration of the conclusions of various investigators in the field of ovarian changes.

In vertebrate embryology, each zygote is primarily bisexual. After an indifferent gonadal period, both the male and female systems of ducts are developed. The chorda testis and the ovary develop respectively from the medulla and the cortex of the gonadal primordia. The mature sex gland may contain in its structure rudimentary homologues of the opposite sex. Maleness is determined chronologically before femaleness. A potential ovary is apparently not present in the male, whereas testicular potentialities exist in the female, particularly in the rete ovarii, the homologue of the vasa efferentia of the male. Sexual differentiation is later maintained to a greater or lesser degree by the overbalance of one or more of the morphologic, endocrine, and emotional components of the mixture of maleness and femaleness.

Hitherto unsuspected connections among morphologically dissimilar masculinizing ovarian tumor types deserve serious consideration, even though their histogenesis is unsettled. Brenner tumors of the ovary, some pseudomucinous cystadenomas of the ovaries, and the tubular form of arrhenoblastomas are morphologically separate, but do have some close histologic relation, which is supported by clinical evidence. The currently accepted histogenesis of these tumors is that they arise from various fetal rests of the ovaries and their appendages. Recently they have been identified with a specific cell, first reported by J. Varangot in a histologic study (Gynecology and Obstetrics, *38:* 11, 1938). The morphology of the grooved nucleus of this cell, which appears in varying proportions in masculinizing ovarian tumors, has been the subject of some studies and has been designated as "coffee bean," "football," "puffed wheat," etc.

D. N. Danforth (American Journal of Obstetrics and Gynecology, *43:* 984–996, 1942) further linked the cytologic relation between Walthard cell rests of the ovaries and fallopian tubes to the Brenner tumors and pseudomucinous cystadenomas of the ovary. Although he could not establish precisely what the relation was, he demonstrated the resemblance of the nuclear detail of some cells of the tumors to the cell with grooved nucleus previously mentioned. At the same time, A. C. Ivy stated that the grooved nucleus cells bore an amazing resemblance to the cells of Sertoli in the seminiferous tubules of the adult testis, and he speculated on the possible relation of the grooved nucleus cell to the Sertoli cell, the function of which in the testis is supportive and nutritive and which

has no endocrine activity, as evidenced in the seminiferous tubules of the cryptorchid, which are composed only of Sertoli cells. Danforth postulated that the establishment of a definite relation here might help solve the problem of the histogenesis of masculinizing ovarian tumors.

The presence of a basic grooved nucleus cell in many pseudomucinous cystadenomas is of further interest because a small proportion of these tumors may be derived from Brenner tumor cell rests. L. B. Arey (American Journal of Obstetrics and Gynecology, *45:* 614–623, 1943) reported on the nature of the nuclear deformity, its frequency of occurrence, and the possible significance of its presence in Brenner tumors, Walthard cell rests, and elsewhere. He said the condition was more common than supposed, since he found it in the epithelium of the rete testis, and from his analysis he suggested the possibility of unsuspected functional potentialities in Brenner tumor cells.

J. C. Furth and J. S. Butterworth (American Journal of Cancer, *28:* 66–95, 1936), in a study of neoplastic disease among irradiated mice, with special reference to ovarian tumors and associated lesions, commented on the similarity of ovarian tumors of these mice to human ovarian tumors. They reported that, as Brambell, Parkes, and Fielding (Proceedings of the Royal Society of Medicine, series B, *101:* 95, 1927) had first described, they, too, had found in the ovaries of irradiated mice, anomalous structures resembling epithelial tubes growing down into the stroma from the germinal epithelium of the ovaries. These tubular adenomas, as they called them, in some cases involved the whole ovary. The adenomas were found only in irradiated mice, and they noted that none had previously been reported in unirradiated mice. There was no evidence of endocrine function in these tubular adenomas; however, in one of the affected mice a concomitant adenocarcinoma of the breast was observed. The incidence of ovarian tumors was fifteen times greater in irradiated animals than in those not irradiated.

More recently, Earl T. Engle (Cancer Research, *6:* 578–582, 1946) has reported tubular adenomas and testis-like tubules in the ovaries of aged rats. The cells lining these tubules bore a pronounced resemblance to the Sertoli cells in the seminiferous tubules. Engle suggests that the occurrence of occasional tubules in the otherwise normal ovaries of senile rats may have some relation to the instances in which the entire ovary is replaced by a tubular adenomatous growth. In his investigation, the observations were made on the ovaries of rats of the Wistar series which were 900 days old or older. The pronounced changes in the ovaries referable to the atrophy of aging occurred in all of this group. The controls were taken from younger rats of the same Wistar series in which no atrophic changes were observed. The tubules which Furth and Butterworth reported they did not find in unirradiated mice were found by Engle in the normal ovaries of some of the aged rats. These tubules were characterized by lining epithelial cells of vague cytoplasmic borders, and nuclear characteristics of the Sertoli cells. A distinct basement membrane was reported. The tubules were located most frequently near the hilum of the rat's ovary, but some were also seen in the cortex and in the ovarian capsule near its attachment to the ovarian hilus. Tubules of the paraoophoron appeared at times closely associated with the other tubules (the "tubular adenomas" of Furth and Butterworth) and appeared identical to the efferent ductules of the testes; however, no continuity or communication was demonstrated between these structures.

Three of the rats in Engle's series showed complete involvement of the ovary by the structures resembling epithelial tubes. He designated them as tumors of the tubular adenoma group. The structural characteristics of the individual tubules of the ovarian adenomas in each of these animals was quite similar to those found oc-

casionally in other ovaries. The common feature characterizing the component cells of all tubules, including those with the Sertoli cell nuclei, was the indistinct cytoplasmic border, as observed in testes where all the spermatogenic cells are absent. It was additionally noted by Engle that two of the rats with the tubular adenomas also had other tumors, one, a squamous cell carcinoma of the uterine cornua, and the other, three adenomas of the mammary glands. No information as to the hormonal status of the genital system of these animals could be obtained from the tissues at hand, and there were no direct morphologic indications of any endocrine action. In several of the most atrophic ovaries, the general pattern was that of an ovary in the postirradiation state, while the characteristics of the rest of the ovaries upon which observations were made consisted of masses of epithelioid cells or so-called interstitial cells of the ovary.

Considering the embryologic development of the chorda testis and the ovaries from the gonadal primordia, Engle suggests that some significance may be attached to the presence in the adult ovarian hilus of tubules characteristic of those in the testis, especially since these structures seem to appear only after growth and proliferation of the ovocytes and follicles have disappeared. However, it must be kept in mind that Wilcox and Mossman (Anatomical Record, *92:* 183–195, 1945) have described testis-like tubules in the ovaries of a shrew during certain stages of the reproductive cycle when the aging factor would not be dominant.

Furth and Butterworth did not describe nor illustrate tubules or cells such as were found by Engle in aging rats. However, in the tubular form of arrhenoblastomas of the human ovary, the characteristic cell and nucleus described as similar to the Sertoli cell of the testis may be found. It is probable that as Robert Meyer suggested for the arrhenoblastomas and other dysgerminomas, the testis-like tubules of the ovaries of aged rats may arise from persisting embryonic rests. In these cases, however, the restriction of the tubular formations in ovaries of rats of the oldest age groups possibly indicates a type of android proliferation which was permitted only after removal of the gynecoid influences.

An attempt has been made to correlate significant observations from previous reports on ovarian changes with those recently made by Dr. Engle. The identification of the characteristic grooved nucleus cell with different organs and structures, the similarity of isolated tubules in the aged ovary to those of tubular adenomas in irradiated mice and in aged rats, the resemblance of the basic cellular structure to the cells of Sertoli in tubules of the testis, the occurrence of other tumors simultaneously with the tubular adenomas, the possible estrogenic effects and embryologic relations—all these observations are waiting to be linked into a picture that some day will explain the relation between masculinizing ovarian tumors and their histogenesis.

RUSSELL L. HERDENER

CARE OF THE CHRONIC ILL

Rather belatedly, the medical profession is coming to recognize that progress in medicine is creating a problem which is fast becoming urgent in its demand for solution. Each advance in prevention and treatment of short-term illnesses saves many persons for subsequent long-term illnesses. It is unfortunate that equal progress has not been made in the prevention and treatment of the latter type of disease. Some of this inequality is inherent in the complexity of the chronic diseases. In part, however, some of the inequality in progress may be attributed to the fact that the place of the long-term patient in a general hospital has not been recognized.

Recently, E. M. Bluestone, director of the Montefiore Hospital in New York, called attention to the lack of provision in general hospitals for intensive scientific care of patients with long-term illnesses (Bulletin of the American College of Surgeons, June, 1946). Because of the practice of grouping all long-term patients in a single category and relegating them to institutions not equipped for intensive care, progress in the prevention and treatment of chronic disease has been handicapped. He recommends that the long-term patients be classified into subgroups according to their needs:

1. Patients who may benefit from intensive medical care.
2. Patients not requiring intensive care:
   a. Convalescent patients,
   b. Patients with residual handicaps or with relatively stationary disease,
   c. Patients requiring only home care.

Dr. Bluestone urges that adequate provision be made in general hospitals for the study and treatment of patients in group 1. Such study and treatment for those in group 2 may, according to Dr. Bluestone, be made possible by the establishment of services and institutions without requiring necessarily great expansion of the general hospital facilities.

An earlier report by Mary C. Jarrett (Public Welfare, June, 1945) emphasizes the contention that the general hospital is the keystone for any community plan for the care of patients with chronic illnesses. She summarizes: " . . . the basic considerations are first to recognize the necessity for making provision for proper care of the chronic sick and for encouraging medical study of chronic diseases. . . . "

The care of certain types of patients in group 2 (those not requiring intensive care) has been attacked in two states—New Jersey and Illinois (Potter, Howell, Lockwood, and Dowdell: Public Welfare, November and December, 1943; Hilliard: Public Welfare, December, 1945). These state and county projects, however, are designed for the economically impoverished and are, therefore, of limited scope. In the reports on the care of the chronically ill and aged in both of these states, the general hospital plays a relatively minor role, receiving the patients only for acute intercurrent illnesses or for the terminal stages of chronic illnesses.

The force of circumstances may soon necessitate immediate action. Administrators of hospitals and social service workers have warned and continue to warn the medical profession of this urgent problem. It is to be hoped that the planning will be done with the full cooperation of the medical profession.

R. E. JOHNSON

TOXIC GOITER IN THE AGED

Hyperthyroidism in the older age groups is an entity that is frequently misdiagnosed. While hyperthyroidism is usually a disease of the younger age groups, its occurrence in the elderly patient is frequent enough to merit serious consideration. The clinical picture is somewhat different than in the younger age groups, however, and certain signs and symptoms take on additional import.

Mora and Greene (American Journal of Medical Science, *181:* 74, 1931), in their studies of 200 cases of hyperthyroidism in persons over 50 years of age, found the ratio of women to men to be 2½ to 1 rather than the usual 4 or 5 to 1. They also report that fourteen and a half years had, on the average, elapsed between the appearance of the goiter and the onset of symptoms. This is an important point to remember in diagnosis, since in younger individuals the onset of symptoms follows much more closely the appearance of the goiter. The mortality from surgical intervention, Mora

and Greene found, was higher in patients over 50 years of age than in persons below that age, the mortality rate being 3 per cent in a series of 200 patients over 50 and only .11 per cent in a series of 860 patients under 50.

Crile (Cleveland Clinic Quarterly, *5:* 117, 1938) found that 40 per cent of patients over 70 years of age with hyperthyroidism had auricular fibrillation or cardiac decompensation. These conditions, along with hypertension and other problems of the aged, tend frequently to mask the disease and also to make older patients poor surgical risks. The mortality rate in Crile's patients was 21 per cent. He advises conservative treatment and thyroidectomy in stages, under local anesthesia, in selected cases. Crile believes that in the presence of hyperthyroidism a malignant tumor of the thyroid is extremely rare, the rate being only .5 per cent in his experience. He therefore considers any goiter associated with hyperthyroidism as benign unless unmistakable signs of malignancy are present.

With respect to signs and symptoms, certain findings take on an increased import in the older groups, while others, which are commonly found in the younger groups, lose their significance. Boas (*Treatment of the Patient Past Fifty*, second edition, Year Book Publishers, 1944) comments on the fact that eye signs are commonly lacking in older persons so that attention is not readily centered on the thyroid.

Weight loss is present in nearly all patients, and Crile believes that the basal metabolic rate is more indicative of hyperthyroidism in the aged than in younger persons. Hendrick (American Journal of Surgery, *52:* 466, 1941), like many others, stresses the fact that most cases of toxic goiter are of the adenomatous type. He believes it is of cardinal importance that the older age groups are not stimulated to the degree that younger individuals usually are, thus accounting for the less dramatic symptoms of goiter in the aged and missed diagnoses.

Whishaw (Medical Journal of Australia, *ii:* 519, 1946), in a review of 60 cases from his own practice in which the average age of patients was 56 years, reported only 5 cases of auricular fibrillation (8.3 per cent). The discrepancy between this figure and Crile's figure of 40 per cent can probably be explained on the basis of the average age difference in the two series. As most other investigators have mentioned, Whishaw points out that the most common error in diagnosis is failure to recognize the underlying thyrotoxicosis in elderly people who have hypertensive heart disease with early congestive failure. Suspicion should be aroused if treatment with digitalis fails to produce the expected improvement.

Another pitfall in diagnosis concerns the psychoneurotic person with a nontoxic goiter. With both toxic and nontoxic goiter, tremor, tachycardia, breathlessness, and weight loss may be present, but the psychoneurotic patients have cold hands, their personalities are different, and the basal metabolic rate is not increased.

"Thyrotoxic hypertension," by which is meant an increase in the systolic blood pressure out of proportion to the diastolic reading, thus giving an increased pulse pressure, is believed to be a common observation in toxic goiter in elderly people. Early diagnosis and treatment are important, since with the mild type of the disease as well as the more toxic type, degenerative cardiovascular changes tend to be accelerated. Whishaw makes the statement that successful treatment of toxic goiter, whether surgical or medical, does not appear to prevent the progress of so-called thyrotoxic hypertension. This is not in accord with other observations, among them being those of Lahey, who has stated that patients without previously existing heart damage, who are relieved of their intoxication by adequate thyroidectomy, frequently exhibit no permanent cardiac damage.

Mora and Greene believe that cardiac decompensation associated with hyperthyroidism results from the effect of the hyperthyroidism upon a previously damaged

heart, rather than directly from the hyperthyroidism. The relative infrequency with which cardiac complications occur in young people as compared to the frequency with which they are found in older groups lends support to the probability of this assumption.

The introduction of thiouracil in the treatment of thyrotoxicosis is a valuable adjunct to the medical armamentarium, but is not without its limitations or dangers. Fowler (International Abstracts of Surgery, *83:* 313, 1946), in a collective review, has studied 1,573 case reports in the literature on the use of thiouracil in hyperthyroidism. Many phases of its use are still debatable, but certain aspects should be mentioned.

Thiouracil is a valuable drug in helping prepare the patient for surgery and in combating the postsurgical "thyroid crisis." In older persons, who frequently have cardiac embarrassment, its use as a preoperative measure may make operation, with a fair prognosis, possible in patients formerly considered to have a poor prognosis and to be unfit for operation. Another valuable use of thiouracil is for the patient who has been taking iodine for some period of time and has become "iodine-fast." Whether the drug will ever place hyperthyroidism solely in the field of medical management remains to be seen. However, the danger of its causing agranulocytosis must be emphasized, as well as the fact that it does not prevent hyperplasia of the thyroid.

DEAN C. KIPP

AGE AND FOWL TUMORS

Cancer comparable to that in mammals occurs in greater incidence in the chicken than in any other species. In spite of the fact that much has been done in the way of transplanting chicken cancer, especially sarcomas, and in the demonstration of causative viruses, little has been done in the past to indicate the relation of the tumors to the age of the animals.

Transplantation of fowl leukosis by inoculation of leukemic blood or tissues and also by cell-free filtrates was first demonstrated by Ellerman and Bank (Zentralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, *46:* 595, 1908). Shortly after, the same thing was done with fowl sarcomas by Fujinami and Inamoto (Gann, *5:* 13, 1911) and by Rous (Journal of Experimental Medicine, *12:* 696, 1910).

That not all avian tumors give evidence of possible virus transmission was evidenced by Claude and Murphy (Physiological Reviews, *13:* 246, 1933), who reported on 40 spontaneous fowl tumors investigated at the Rockefeller Institute, of which only 4 were transplantable and later (Peacock: Cancer Research, *6:* 323, 1946) transmissible by cell-free filtrates.

Murphy and Sturm (Cancer Research, *6:* 13, 1946) induced in pigeons sarcomas which were known to be transplantable to other pigeons of the same breed, but they were unable to transmit the sarcomas by filtrates and dessicates.

Shrigley, Greene, and Duran-Reynals (Cancer Research, *5:* 364, 1945) demonstrated that Rous sarcoma virus could be varied by passage through the guinea pig eye, as well as by storage. Burmeister, Prickett, and Belding (Cancer Research, *6:* 189, 1946) demonstrated a filterable agent in a chicken lymphoid tumor strain which induces osteopetrosis and lymphomatous tumors of the viscera after an incubation period of two or more months.

An attempt to find a virus of mammalian tumor (Twombley and Meisel: Cancer Research, *6:* 91, 1946) revealed no proof of the presence of a virus or filterable agent after mammalian tumors were grown on fertile eggs.

An interesting feature is that trans-

plantation of mammary gland carcinoma of the rabbit has not been successful where there is only local tissue invasion, but the transplantation can be performed successfully as soon as the tumor shows the malignant ability to metastasize or invade foreign tissues in the host (Greene: Journal of Experimental Medicine, *71:* 323, 1940). But Duran-Reynals (Cancer Research, *2:* 343, 1942) found that after passing Rous sarcoma through forty generations of ducks the virus obtained consistently induced sarcoma in adult chickens, although no metastatic neoplasm was found in any of the ducks but merely a rapidly growing single lesion. Variation of the chicken virus was not observed in this series of Duran-Reynals.

There are antibodies present against some cancers (Rous and Fuginami sarcomas and Mill Hill 2 endothelioma) with a parallelism between antibodies and lack of cancer from virus in chickens (Rous: Journal of Experimental Medicine, *12:* 696, 1910).

Duran-Reynals (Cancer Research, *2:* 368, 1942) found it possible to infect ducks with extract of Rous sarcoma if the ducks were injected with large doses of virus within the first twenty-four hours after hatching. Resistance of ducks to tumor cells paralleled resistance to the virus. Specific neutralizing antibodies against a duck variant were detected (King and Duran-Reynals: Yale Journal of Biology and Medicine, *16:* 57, 1943) in sera of ducks as early as five hours after hatching, and frequently as early as twenty-four hours; the antibodies were found in progressively greater strength in sera from older animals.

Duran-Reynals (Cancer Research, *6:* 529, 534, 1946) demonstrates an age relationship with transplantability and demonstrable presence of a cancer virus, shown by the inducement of cancer in chickens by filtrates from sarcomas of other chickens. In 14 spontaneous chicken sarcomas grouped according to age of the chicken bearing the neoplasm, the presence of a causative virus, transplantability of cells, and other properties of the tumor have been studied. Of 5 sarcomas found in chickens 23 days to 18 weeks of age, Duran-Reynals indicates that 3 could have been transplanted indefinitely; in 5 sarcomas in chickens 5 to 10 months old, 4 proved indefinitely transplantable, and causative viruses were demonstrated; of 4 sarcomas found in chickens 12 to 18 months old, only 1 proved indefinitely transplantable, with a causative virus found in the filtrates. Duran-Reynals found metastases of chicken sarcoma in 12 of 19 tumors studied; on transplantation, all of the 19 tumors induced metastases. But " . . . functional malignancy in sarcoma of the chicken is to a large extent independent from morphological malignancy."

Transplantation in the chickens which Duran-Reynals describes was done with a suspension of one part cells and four parts of saline solution. The filtrates were made by filtering one part tumor with nineteen parts of saline solution through Berkefeld N candles.

Causative virus was demonstrated only in those sarcomas which were indefinitely transplantable; all 5 produced metastases in the original host. Filtrates from nontransplantable tumors were uniformly ineffective. Indefinite transplantability was constantly associated with histologic malignancy, but the reverse was not found to be true. Adult chickens inoculated with cell suspension rarely showed tumor growth.

Of 7 fibromas in chickens 8 to 30 months old, only 1 could be transplanted through two passages. Histologically, all of the fibromas were rated at zero malignancy; none induced metastases. An additional group of 5 chickens 4 to 5½ years old showed 9 neoplastic lesions, of which 8 were benign clinically and histologically; cell suspensions from the one malignant lesion and 2 of the benign ones yielded no tumor development.

In man's enduring race to ferret out the cause and cure of cancer, it may be the hen and not the goose that lays the golden egg.

GEORGE W. WILSON

WINTER AILMENTS OF THE OLD

Although there is no difference in the longevity of people living in different climates, there are certain factors connected with the winter climate which are conducive to ailments of the aged. These ailments are common all year round but are aggravated or developed much more quickly during the winter. There are the factors of cold or inclement weather, the greater incidence of and opportunity to contract upper respiratory diseases, the confinement to the home with its often poor ventilating and heating systems, and the lack of sunshine and moderate exercise.

The most frequent ailments occurring in the winter are the upper respiratory infections and the common complication of bronchopneumonia. A "cold" or cough in an elderly individual is not to be taken lightly. The loss of elasticity of the lungs resulting from senile emphysema, the rigidity of the thoracic cage, the diminished excursion of the diaphragm—all presumably favor the collection of secretion of the lungs and prevent the expulsion of this material when the lung becomes infected (Boas: *The Patient Past Fifty*, Year Book Publishers, Chicago, 1944). The infection may not be virulent enough to develop a pneumonia, but it can be sufficiently irritating to cause a chronic bronchitis with a persistent cough. A prolongation of the bronchitis can cause further weakening of the already diminished immune state and lead to bronchial pneumonia.

Treatment and handling of such conditions in the aged are different than in the younger age group. The dictum of Socrates must be followed: "Everything in moderation." Bed rest must be prescribed with discretion, from both mental and physical considerations. Because of society's attitude toward their usefulness, old people easily develop a complex that they are not wanted or are superfluous, and since the idea of death is always hovering in their mind, it is wise to keep them up in a chair or allow them to use the bathroom. This serves to avoid the development of pulmonary and circulatory stasis, which would further overburden the limited physical capabilities of the aged. At the same time, the will to live is maintained, for as long as the older person can be somewhat active he forgets the nearness of death. All therapy should be directed to keeping the patient comfortable. Too many physicians forget that they are treating a sick person and not merely a disease.

Since it is admittedly difficult to treat successfully elderly persons who contract pneumonia, the best plan is to advise them as to prevention. Elderly people require a warmer room than younger ones. A temperature of about 75 F with proper ventilation is desirable. When walking outdoors, individuals should be well clothed so as not to get chilled. Persons with colds and coughs should be avoided as much as possible. Bathrooms and beds should be warmed. Reading and light work should be encouraged to keep them alert and make them feel as though they "belong." These considerations are applicable not only to the prevention of pneumonia but are equally applicable to various other ailments to be discussed briefly.

The cardiovascular system, which is generally impaired in the aged, gives rise to ailments resulting from winter cold. Effort angina develops from exposure and walking against a cold wind. Old people move slowly, their physiologic responses are sluggish, and they cannot generate enough heat through muscular action to compensate for exposure to cold temperatures. Thus an aged man with some coronary involvement should not perform any heavy work in cold weather, lest an infarction result because of reflex narrowing of the coronary arteries from the cold. Numbness of the extremities is a lesser discomfort resulting from exposure to the cold (Barber: The Practitioner, *157*: 357–361, 1946). Infections such as erysipelas and carbuncles commonly tend to develop toward the end

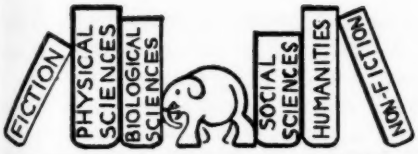
of winter. Various reasons for this have been postulated. Lack of sunshine because of confinement to the home, reduced consumption of fresh fruits and vegetables, neglect of personal cleanliness, and restricted activity all play a part. These factors, while true for the younger age groups, are for them not so conducive to infection as in aged persons, whose resistance is lowered. During the winter, chronic ailments, such as osteoarthritis, are aggravated. Actually there is little that can be done except to encourage the individual and try to stimulate him mentally with interests which are suited to his capabilities.

One of the best therapeutic agents for the aged is alcohol in moderation. The *Regimen Sanitas* of Salerno, written some 800 years ago, sums it up well:

Sound wine revives in Age the heart of youth,
While poor wine acts the other way, forsooth.
Pure wine on all refreshment will bestow,
In brain and stomach cause a cheerful glow,
And stagnant currents force anew to flow.
'Twill all depressing, carking gloom remove,
Sharpen the mind and also sight improve,
Quicken the ear and the whole body nourish,
And cause old age with youthful bloom to flourish.

All therapy for the aged, whether it be for summer or winter ailments, should be directed toward alleviating the loneliness of older persons and toward restoring to the individual a sense of responsibility and usefulness. Advanced age does not necessarily mean senility, for Darwin, Franklin, Browning, Holmes, Goethe, Verdi, and others were far advanced in years when they created some of their best works. The capacity for learning may be diminished, but this is offset by increased powers of concentration. When the fire and drive of youth have subsided, wisdom and judgment arrive to replace them.

ANGELO P. ANGELIDES



BOOKS

THE YELLOW LEAF, Mort Friedlander, Current Books, Inc., New York, 1946, $2.00.

The Yellow Leaf is a different genre than either novel or essay. It is a character study of old age, a three-dimensional picture of life in an old folks' home.

There are no typed characters, but rather each man and woman in the home is the elderly result of his own youth and vigorous maturity. Miss Davies, the shy and gentle spinster, secretly visions in the person of an old bachelor druggist the romance she had never known. Mrs. Dermitt, maladjusted and ridden by a persecution complex throughout her life, is now a warped old woman who maliciously casts her words like drops of venom into the minds of others. Mr. Cribben, of the erstwhile acrobatic team, the Flying Cribbens, took chances every day of his life " 'from when I was 10 until I was 44, excepting time out for accidents,' " and as a bedridden old man is still undefeated in either body or spirit.

Yet all the occupants of the home are alike in certain fundamental respects. They all need to be occupied and to feel important. Even Mr. Purdee, who had been the leader of the County Democratic Party for twelve years and considered it ridiculous to be reduced to playing such children's games as Fourth of July Committee, "felt a thrill of realization" as the Fourth arrived and the efforts of the committee were about to be appreciated.

The minds of all of the old people are much taken up with thoughts of the past because the past seems so close to the present. However each of them views differently the relation between past and present, youth and age. Mr. Purdee is brusque and realistic: " 'It's like watching them hook the best trout you ever saw, and the most you can say is you caught one, too, forty-three years ago.' " Mr. Sirken, whose wife has just died, rejects the present in his nostalgic yearning for the past: "He grew homesick with the ache to return, to thrust himself back by main force, if necessary, in order to repeat what had been. . . . He had passed over much too lightly. Now it was impossible to make retribution any more, since the sweetness of the past had lain in its once being the present." However, Miss Davies is convinced "that growing older meant changing only outwardly while people's thoughts remained the same. She didn't feel any different from when she was a girl."

Perhaps the warm-hearted superintendent of the home, herself only middle-aged, senses most fully the relation between youth and age, for she realizes that both are part of life, and, as such, are equally necessary.

"The Yellow Leaf" is a warm and human companion of a few hours, leaving the reader to contemplate his own old age in a calm and mellow mood.

RITA NOAH

SOCIAL ADJUSTMENT IN OLD AGE. A RESEARCH PLANNING REPORT, by the Committee on Social Adjustment in Old Age of the Social Science Research Council, New York, 1946.

The committee members are to be congratulated on their excellent analysis of many of the unanswered questions dealing with the aged. They have proposed countless years of research by workers in such fields as population, wages, personality, medicine, and psychiatry. However, it is to be wished that the major report of 145 pages were as clearly and legibly repro-

duced by the mimeograph process as the 77 pages of bibliography.

Actually the committee has set forth an organized blueprint for future research in problems of the aged which is well done, well organized, and modest in its assumptions of knowledge about the aged.

The following questions, raised in the report, may be considered basic: (1) Who will do the necessary research? (2) What are the sources of funds to stimulate careful investigation? (3) How should the sources of materials be organized for continuity and comparison of study? (4) What is the implication of the changing age distribution upon the economy of the country (not generally but specifically)? The report stresses the necessity to establish counselling services for the assistance of the aged in their psychological problems, and the need for continuing and intensified medical, dental, and psychiatric research into specific situations of the aged.

At one point, the report analyzes census figures of population, discussing the problems of the aged widow living alone or living in a child's home or those of the aged couple living alone. The Western states, especially Washington and Oregon, have attempted solutions of these housing problems. Aged persons or couples require, generally, only modest surroundings. They need small dwelling units and the possibility of privacy, yet with such a physical arrangement that some able-bodied person is always at hand to give the casual or emergency supervision which declining health requires. Aged persons may not be able to carry on such usual household duties as cleaning, washing, tending the furnace, and shopping; further, aged persons cannot be left alone because of the danger that they will not be able to summon assistance if needed. And yet the urge for privacy is strong. The efforts of fraternal and cooperative groups in the West to provide unsubsidized housing which answers the needs of old people, as well as the efforts of social agency groups in New York State, call for further investigation. They also point to the need for special design of structures suited to an increasing number of the aged.

Social security laws have tended to reduce the need for private homes for the aged, such as were known in the nineties and later. It would appear that the trend in homes for the aged is towards convalescent homes for all age groups and away from purely custodial care. Public provision in institutions, through county homes, also seems to be declining in importance. The convalescent type of home calls for a greater and more specialized staff, intensive treatment, and higher costs per resident. Therefore, the able-bodied aged person, in reduced physical health, yet decidedly ambulatory and also with funds, may soon require a special type of housing and care, which insures privacy and yet provides for housekeeping, meals, and supervision.

Here is a challenge to fraternal groups to provide this type of housing for the aged. The construction of a special type of dwelling for the aged could also be a commercial enterprise. In any case, a series of factors—architectural, fiscal, housekeeping, and medical—must be considered in putting up housing for the aged.

Another point raised concerns the relation of the aged to industry. Is there in the offing a readjustment of industrial practice so that a man does not become "too old to work" at the age of 45? Is a readjustment necessary in the concept of wages? Should industry employ persons of 55 or over? Are these aged persons to be paid less than they formerly earned because of diminished strength and productivity? What type of readjustment is needed among prospective aged employees to induce them to accept lesser wages cheerfully? Or shall the aged person remain increasingly in the category of the unemployable?

There also appears an urgent need for a public awareness of the services to be rendered the aged by professional counselling. Considerable exploration is indicated in methods of treatment. Nothing less than

pioneering and long time public education will be effective.

Apart from the poor legibility of the main report, the members of the Committee on Social Adjustment in Old Age have done an excellent job. Perhaps they can also stimulate actual work and the donation of the funds required for competent research in this field.

W. A. GOLDBERG

THE BEST YEARS

THE BEST YEARS, Walter B. Pitkin, Current Books, Inc., New York, 1946, $2.00.

The Best Years is a primer of the art of retirement. Written in simple, forceful language, liberally illustrated with anecdotes about older men and women whose later years have been, for some, the best, and for others, the worst, this little book contains many excellent pointers for achieving the best years after vigorous maturity is past. The titles of some of the chapters summarize many of these points: "Cultivate a Retiring Disposition," "Tapering Off," "Use It or Lose It," "The Disease of Ease," "Keep Ahead of the Times," and "Stay in Circulation."

Walter Pitkin's underlying thesis is that, with the atomic age and the revolution it will produce in every aspect of life, it is more than ever necessary to plan for retirement and more than ever possible to make the years of retirement the best years. Before too long, Pitkin believes, the thirty-hour week, and then the twenty-hour week will become realities, because a few men will be able to produce more in a day than many could once produce in several days. In addition to each man's working fewer hours a day during his working life, he will stop working sooner so that younger men may take over the reduced number of jobs. This picture does not spell economic disaster to Mr. Pitkin, however, since he believes, quite optimistically, perhaps, that with scientific and technologic advances, the cost of everything from food and shelter to luxury items will go down so as to bring most of the fruits of the increased efficiency of mass production within financial reach of all.

To enjoy the many years that come after retirement it is necessary to start planning for them early in life—the earlier the better, though at any age it is still possible to increase the enjoyment to be found in the later years: the years that are best for living one's own life. Few people are born with a "retiring disposition"; for most, it must be acquired. Towards this end, it is important to see that habits and routine do not become the master of the individual. "Break at least one pleasant habit every day." Pitkin also advocates frequent short vacations, a vacation being an hour each day when an individual takes a walk or reads a book or stretches out on a beach, quite as truly as a trip to Florida.

Each individual should begin early to do many things—"Part time's the best time for any activity. . . . He who repeats something too often loses interest in it. So he loses a normal incentive to go on doing it. Then repetition becomes a horror." An individual should begin several years ahead of time to plan where and how to retire, and then arrange to taper off gradually, so that when the day of retirement comes there will be no sudden shock as a single purpose in life, encased in habits and routine, comes to an abrupt stop.

If persons have not begun early to lead a diversified life, they will have to work at the job of creating new interests to take the place of their job or profession. Thinking back upon the first twenty years of life, when an individual has many desires and ambitions, not yet submerged by the responsibilities of earning a living, will often bring to mind suggestions of interests and hobbies that can be adapted to the later years. The most essential ingredient

for happiness in these later years is a "self-starter" that keeps the individual on the go, that refuses to let him say when he retires: "I'm through." Ease frequently becomes a disease.

Throughout his life, and particularly after he passes the age of 50, a man must keep ahead of the times. Living in the past is the "perpetual menace of retiring." Staying in circulation by cultivating younger friends to replace the old friends who move away or die is the best way of living in the present for the future. But to be accepted by younger people is not always easy. A first step is for older persons to be proud of their age and its blessings, for people are usually taken first of all on their own appraisal. Once accepted, it is important for the older person to do with and for younger people only what they want him to do.

One vital role which older people alone can fill is that of counselor. Every endeavor needs its counselors: government, business, factories, marriage. "The evil of the ancient rule of the elders lay in the rule. They commanded. The young had to obey. But there is a wiser way. Let the old advise, let the young consider." Bernard Baruch is pointed out as perhaps the oustanding example of what experience and mature wisdom can contribute. "We must create a new buffer state of wise men on park benches."

Pitkin concludes *The Best Years* with a list of twenty-one questions each retiree should ask himself, to be used as a yardstick for the measure of traits that indicate an individual is aging in other ways than chronologically. If these traits are kept under control, it will be possible to say, at 82, with George Santayana: "I have never been happier in my life than now."

RITA NOAH

BOOKS RECEIVED

Books received since Sept. 1, 1946 are acknowledged in the following list. Insofar as space and time permit, some will be selected for review in a later issue, but it is unlikely that all will be reviewed.

The Second Forty Years, by E. J. Stieglitz, J. B. Lippincott & Co., Philadelphia and New York, 1946, $2.95, 317 pages.

The Yellow Leaf, by Mort Friedlander, Current Books, Inc., New York, 1946, $2.00, 185 pages. (Reviewed in this issue, page 87.)

Aging Successfully, by George Lawton, Columbia University Press, New York, 1946, $2.75, 266 pages.

INDEX TO CURRENT PERIODICAL LITERATURE

It is difficult to cover all journals and list all papers concerned with aging and the aged. Authors and publishers are requested to call attention to publications or send reprints.—Editor.

AGRICULTURE—Growth and Aging Problems in Agriculture. Samuel Brody. *Science, 104:* 307–312, 1946.

ALEXANDER, CHESTER—The Longevity of Social Scientists. *Social Forces, 25:* 46–48, 1946.

BARBER, HUGH—Winter Ailments of the Old. *The Practitioner, 157:* 357–361, 1946.

BRODY, SAMUEL—Growth and Aging Problems in Agriculture. *Science, 104:* 307–312, 1946.

BRUNGARDT, T. S.—Recreation for Older People in Rural Communities. *Recreation, 40:* 416–418, 1946.

CANCER—Transplantability of Virus in Spontaneous Sarcomas and Fibromas of Chickens in Relation to the Age of the Tumor-Bearing Animal. F. Duran-Reynals. *Cancer Research, 6:* 529–534, 1946.

CATHOLIC CHURCH—Legal Developments Affecting the Church. *Catholic Action, 28:* 23, 1946.

DURAN-RENALS, F.—Transplantability of Virus in Spontaneous Sarcomas and Fibromas of Chickens in Relation to the Age of the Tumor-Bearing Animal. *Cancer Research, 6:* 529–534, 1946.

ENGLE, EARL T.—Tubular Adenomas and Testis-like Tubules of the Ovaries of Aged Rats. *Cancer Research, 6:* 578–582, 1946.

GENERAL—Aging: A Family Problem. W. R. Stanford. *Social Forces, 25:* 61–65, 1946.

Antidote to Loneliness. Gladys Morrill. *Recreation, 40:* 303, 1946.

Creative Energy Is Ageless. H. A. Levine. *Recreation, 40:* 375–376, 1946.

Don't Count Your Age in Years. J. J. O'Neill. *Science Digest, 20:* 17–19, 1946.

How Old is Old? George Lawton. *Hygiea, 24:* 918–919, 1946.

How to Stay Young. George Lawton. *American*, December, 1946, p. 48.

"The Oldest Man in the World": That Is How He Was Known in the Kentucky Mountains. Percy MacKaye. *Survey Graphic, 35:* 364–365, 1946.

GOITER—Toxic Goitre in the Middle-Aged and Elderly. R. Whishaw. *Medical Journal of Australia, ii:* 519–521, 1946.

GREER, INA MAY—The Menopause: When Life Begins Anew. *The Woman*, December, 1946, pp. 85–88.

HOMES—Foster Home Care for the Aged. Margaret W. Wagner. *Journal of Social Casework, 27:* 238–242, 1946.

Orthodox Jewish Home for the Aged. Mrs. Julius Savit. *Public Aid in Illinois*, September-October, 1946.

LAWTON, GEORGE—How Old Is Old? *Hygiea, 24:* 918–919, 1946.

How to Stay Young. *American*, December 1946, p. 48.

LEVINE, HARRY A.—Creative Energy is Ageless. *Recreation, 40:* 375–376, 1946.

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WINTER AILMENTS—Winter Ailments of the Old. Hugh Barber. *The Practitioner, 157:* 357–361, 1946.